The Newspaper of Information Systems Management
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COMPUTERWORLD

SPECIAL 1994 FORECAST

HAL MAYFORTH

▶ It's 1994. Welcome to the world of wireless, multimegabit, rightsized, group-enabled, GUI-based, object-oriented, user-empowered, decentralized, multimedia, massively parallel, totally open, mission-critical, almost-impossible-to-cost-justify computing. Our annual Forecast issue, which begins on page 13, will give you a head start on what promises to be another chaotic year.

HP to enter outsourcing

By Mark Halper

Hewlett-Packard Co. plans later this month to formally launch an outsourcing division that provides systems management and interim data processing to customers migrating to distributed computing. The move will stiffen HP's challenge to IBM's withering data center supremacy.

HP joins the movement among outsourcing vendors to assist in the transition to client/server computing. SHL Systemhouse, Inc. and Perot Systems Corp. have taken a similar tack in taking on giants Electronic Data Systems Corp., IBM's Integrated Systems Solutions Corp. subsidiary and Computer Sciences Corp. HP is expected to focus on its own customers.

On Jan. 17, HP will announce that its new division is using its Atlanta customer support center as a remote processing site. The division is also providing on-site processing services, sources said.

The client/server outsourcing market is expected to reach $6 billion by 1996, according to Forrester Research, Inc. in Cambridge, Mass.

The outsourcing program calls for HP to provide network and distributed systems management once a customer migrates to client/server systems, said one analyst, who requested anonymity.

HP plans to take a "selective outsourcing" approach that would revolve more around managing distributed computing installations than running corporate data centers, added Mike Melenovsky, di-

HP, *page 2*

NetWare challenges

Users press for RISC

By Elisabeth Horwitt

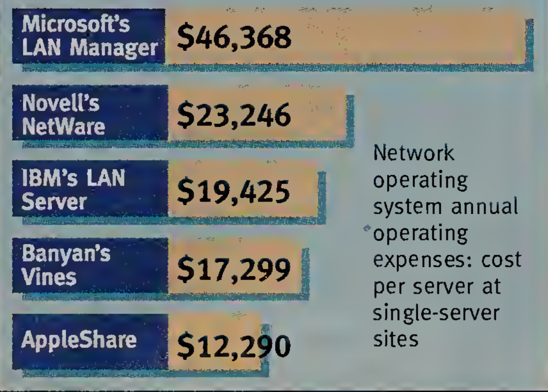
Novell, Inc.'s promised port of NetWare to RISC platforms is running into deadline pressure from customers whose applications are hitting the wall on current Intel Corp. hardware and who are tired of adding more servers to carry the load.

But some users face up to a year's wait. Novell has promised NetWare on Digital Equipment Corp. and Sun Microsystems, Inc. RISC platforms by the end of 1994

RISC, *page 4*

Serving the cause

Running NetWare on Intel-based platforms is costly, particularly if multiple servers are required



Source: Business Research Group, Newton, Mass.

IBM revamp further unifies product sectors

Melding systems in one unit may aid component sharing

By Michael Fitzgerald and Johanna Ambrosio

IBM's recent overhaul of its mainframe and PC groups means that, for the first time, all of the company's operating systems are under the same roof.

This will become increasingly important as IBM begins to share components among its product lines and could lead to an IBM that can easily offer customers scalable hardware and software, users and analysts said.

REMAKING IBM

The shift came late in December when IBM Chairman Louis V. Gerstner split the Personal Systems group. He moved the Advanced Workstation division, home of the RS/6000 and AIX, and the Personal Software Products division, which makes OS/2, Workplace OS and Taligent, in with the ES/9000 and AS/400 groups [CW, Dec. 20].

The IBM PC Co. and Power Personal Systems were placed in a separate organization (see chart page 6).

Share and share alike

An internal memo from Gerstner, circulated on Dec. 17, said in part that the changes came because "there are enormous opportunities to share development and manufacturing capabilities across our product lines."

For example, company executives have said that object-oriented efforts spearheaded by Taligent will find their way into the AS/400 and other high-end operating systems, creating an

IBM, *page 6*

Per-user pricing gets boost

Informix's database fee plan could start industry trend

By Kim S. Nash

■ Informix Software, Inc.'s recent decision to shift to pure per-user pricing of its data products — and away from mainly hardware-dependent pricing schemes — could be indicative of an overall pricing and packaging revolution under way in the database industry.

For example, rivals Sybase, Inc., Oracle Corp. and The ASK Group, Inc. have acknowledged plans to change pricing or packaging during the next quarter in response to user demands for simpler, more flexible schemes that can be tailored to client/server applications of varying size.

The flexibility aspect of client/server's appeal has highlighted two thorny problems with traditional database pricing:

- A large, expensive Unix database, such as Oracle 7, is overkill for a low-end workgroup application with a small number of users.
- Pricing factors in size and model of hardware and number of named users frustrate companies deploying client/server systems, which contain more unknowns than host-

Pricing, *page 8*

Changing bases

Where the Big 4 Unix database players are making pricing or packaging changes:

Informix: Going to pure per-user pricing, regardless of hardware platform.

Ingres: Has already split database pricing into three classes that depend on the number of users. But it plans further refinements in early 1994, including the breakout of advanced features priced as discrete "products."

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Newspaper

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Editor's note

From '93 chaos, future success

There's a terrific, almost trademark scene in the movie *Home Alone* when the young desertee is trying to get comfortable with the trappings of his newfound independence. After lathering up for a close shave, he pours a heaping helping of dad's cologne into his cupped hands, splashes the alcohol-laden mixture onto his face and AAAARRRRGGGHHHH! THAT HURTS LIKE HELL!

Somewhere in the last few years, information systems was left alone as well. The neat and tidy community of vendors, buoyed by various de facto standards promulgated chiefly by IBM, shepherded IS through the growth stages of hardware, software and networking. The systems were programmed by IS far more than they were designed and built. It was an orderly time, a nurturing time. An occasional sip of dad's beer, a drop of watered-down aftershave on the checks.

> The IS community today is home alone.

Of course, it wasn't all that simple. But today, I'd wager it sure seems that way, relatively speaking.

The IS community today is home alone. Here, try fixing yourself some client/server stew for breakfast. Yuck! That tastes terrible. Full of bones, too.

Maybe I'll flip on the stereo and listen to some soothing interoperability tunes. Holy #&%@! My ears!

Perhaps I'll just lie down and catch a nap on mom and dad's queen-size bed of open systems. Yow! There are bugs in this bed, lots of 'em, big ones!

Then there's this constant parade of salesmen at the door, each of them selling a bit of the solution to your woes here, a bit there. Problem is, the bits just don't seem to work together when you try to make one bit work with another. And these salesmen are hurling all sorts of oxymoronic-sounding buzzphrases at you, such as "multiple standards."

Yup, it's plenty chaotic out there. Too many choices, not enough direction. But cheer up. The greatest achievements in history have been born of adversity and chaos, both of which are in great supply.

So you have to believe your greatest successes are yet to be.

Bill Laberis

Bill Laberis, *Editor in chief*

HP to enter outsourcing

CONTINUED FROM PAGE 1

rector of service business strategies at International Data Corp. in Framingham, Mass.

HP has already signed a number of Fortune 100 clients, including Ford Motor Co., according to the analyst who requested anonymity. Ford could not be reached for comment by press time.

HP declined to comment on its outsourcing endeavors other than to say it has created an outsourcing division headed by Layne Nonenberg, previously a marketing manager in HP's customer support organization. The new division is part of that organization, which also provides maintenance, help desk support and systems integration services.

Outsourcing support

HP has been one of the few major computer makers that does not offer outsourcing services. No. 1 IBM has an outsourcing subsidiary, and No. 3 Digital Equipment Corp. has a dedicated outsourcing unit. Unisys, too, has an outsourcing unit.

Smart move

Users said they view the move as a smart business ploy to collect services revenue in a world where margins on hardware are growing slimmer.

However, John Jazwiec, chief information officer at Barber-Colman Co. in Rockford, Ill., pointed out that success in the outsourcing business is no cinch.

"I'd be concerned about them branching out too much," Jazwiec said. "I don't know that they have the support structure because they're having trouble supporting customers with large data centers."

He declined to elaborate on HP's specific data center support shortcomings other than to say the company has a shortage of people skilled in supporting mission-critical environments.

Another HP user, who asked not to be identified, agreed, noting that HP "does not have the experience at running large data centers."

Tim McCollum, an analyst at Dean Witter Reynolds in New York, said he expects HP to focus its outsourcing activity on existing customers because the company would have difficulty presenting itself as an objective services provider unattached to selling HP-brand hardware and software. "You're seeing a lot of hardware companies making that move just to leverage their own hardware," McCollum said.

The analyst who requested anonymity said that while HP will initially process for customers who use HP platforms, it is hiring other outsourcing specialists to handle processing of non-HP hardware.

HP, historically, has waited to enter segments of the computer services market. It was tardy getting into systems consulting because it feared competing with partners such as EDS and Andersen Consulting.

Senior editor Craig Stedman contributed to this story.

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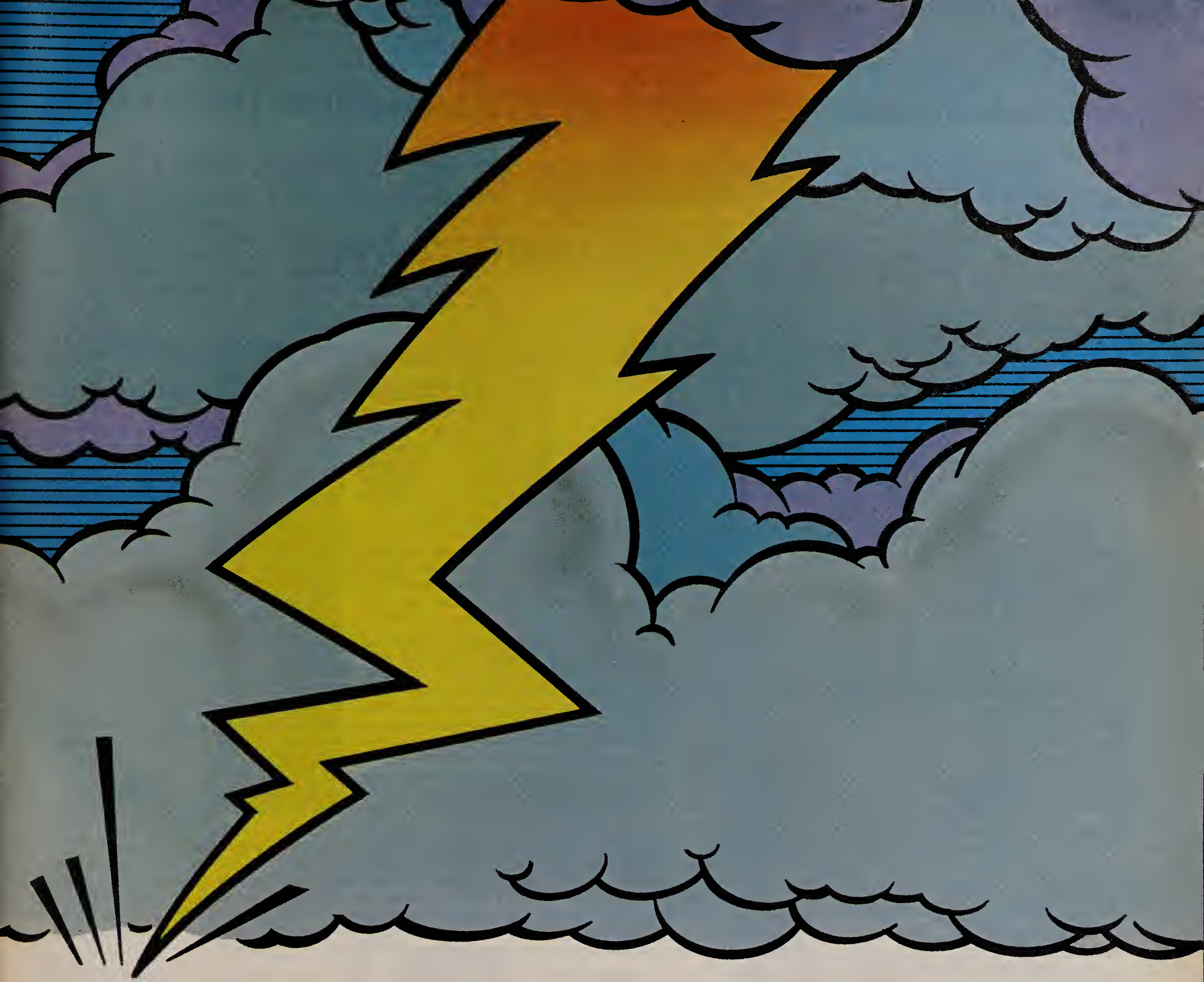

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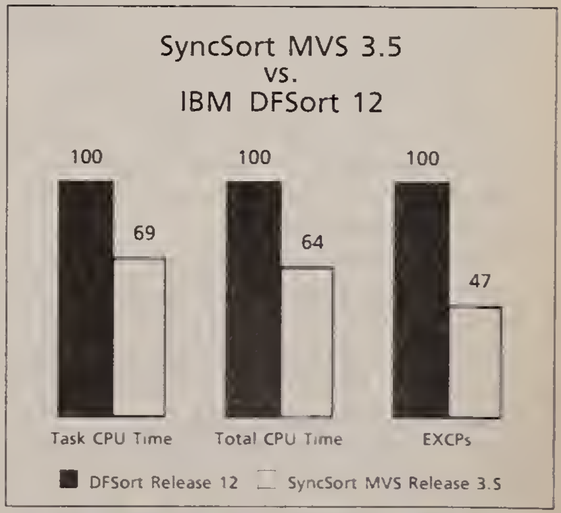

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Users press for RISC

CONTINUED FROM PAGE 1

as part of its Processor Independent NetWare initiative.

Some relief may be on the way for Hewlett-Packard Co. users, however, because HP has targeted the first quarter, or the second quarter at the latest, for its PA-RISC implementation of NetWare.

And Oracle Corp., in response to strong customer demand, plans to provide its SQL database server on HP's NetWare platform as soon as that platform ships, said John Pilot, vice president of Oracle's HP products division.

Meanwhile, rather than wait, information systems managers may decide to move their SQL database services from NetWare Loadable Modules (NLM) to an existing non-NetWare RISC-Unix platform.

Other users said they would look at Processor Independent NetWare when it appears.

Lourdes Hospital, for example, needs a RISC-based platform to handle its long-term corporate database needs. Lourdes is eyeing Gupta Corp.'s SQLBase Server and debating Unix vs. an NLM as the underlying platform, said Tom Witteman, PC support specialist at the Binghamton, N.Y., hospital.

Being able to upgrade NetWare file servers to RISC and run the database engine off the same stations "would be wonderful," he added.

A more powerful NetWare platform cannot come too soon for companies such as Morgan, Lewis & Bockius, where server overloads are a common occurrence, said Donald Sternfeld, director of IS at the Philadelphia law firm.

With "all of our users wanting to access all applications," the firm must constantly upgrade its hardware and storage capacity, Sternfeld said. "Unfortunately, network operating system vendors regard hardware as a commodity."

Unknown quantity

Meanwhile, Novell is positioning it Unix/NetWare blend, UnixWare, to catch users who insist on Unix-based application servers, which can work in tandem with NetWare file and print services. However, some users said they still view UnixWare and Novell's plans for it as a question mark.

One major financial company plans to evaluate UnixWare, along with other Unix platforms, as its enterprise database application server, a systems consultant at the firm said. In addition to providing a more robust environment than NetWare, most Unix systems support symmetrical multiprocessing (SMP), which allows heavy-duty applications to harness the power of more than one CPU, he pointed out.

UnixWare is scheduled to support SMP sometime in 1994. Novell plans to clarify its multiprocessing plans for NetWare early this year, said Bob Young, vice president of the NetWare products division.

What to do now

Customers with immediate database bottlenecks can take the step of distributing the SQL database services across multiple 386-based NetWare servers, Young said. Novell 4.01's NetWare Directory Services (NDS) can transparently route clients to whatever server has the requested data. Such a hardware configuration tends to cost less than a single RISC box, Young said. It costs about $10,000 total for four 386 single-processor boxes vs. $20,000 for a typical four-processor box.

However, this type of solution works only for companies that have clear demarcations for database applications or user groups, Pilot said. While NDS works fine for routing ad hoc user queries to the right database server, partitioning production databases across multiple servers "is far from optimal," he added.

Production databases, which require major CPU crunching, are primarily the applications that are "running out of headroom" on current NetWare/Intel platforms, Pilot said.

Users also see the move to RISC as a means of consolidating their applications onto fewer boxes, a move that saves money not so much in hardware costs as in administrative expenses, vendors, analysts and users agreed. Nor is NetWare by any means the least-expensive network operating system to administer, according to a recent Business Research Group study.

Cisco offers direct link to host processors

By Joanie M. Wexler

■ Moving to further tear down the hierarchical IBM network walls, Cisco Systems, Inc. will announce today a direct channel connection for its high-end routers, according to sources familiar with Cisco's plans.

The goal of the product, which is en route to beta testing and is slated to ship midyear, is to link corporate mainframes directly to TCP/IP, Novell, Inc. NetWare and Open Systems Interconnect LANs.

Bundling the host-to-LAN connectivity within a router — in this case, the high-end Cisco 7000 — would obviate in many sites the need for IBM's 3172 controller, an OS/2-based "liaison" device with a host connection on one side and a LAN connection on the other. A 3172 costs from $15,000 to $55,000.

Direct connections from the router to both IBM's fiber-based Escon and copper-based bus-and-tag channels would also eliminate the need for many functions of the IBM 3745 front-end processor, analysts said, which could eat into IBM's sales of the up-to-$2 million devices.

Caution: Danger ahead

Anura Guruge, an independent consultant in New Ipswich, N.H., cautioned users to think carefully before trusting their host-to-LAN link to a "company that until three months ago did not know what a bus-and-tag cable was." He estimated that at least 50,000 IBM 3745s and 5,000 to 10,000 3172s — the devices the Cisco product aims to emulate — are installed today.

Observers said the Cisco product could simplify management, reduce the number of potential network points of failure and possibly increase network throughput. They also said the link's success will depend on how well it emulates the 3172.

For example, provided Cisco offers an apples-to-apples approach, "we'll consider it for simplified management and better performance," said Kurt Muehlbauer, supervising analyst at Commonwealth Edison in Chicago, a large Cisco shop planning to install the 7000 in 1994.

Off-load vehicle

On the other hand, the utility is running a newer 3172 model with IBM's "off-load" feature, which shifts some of the protocol processing from the mainframe to the controller. Muehlbauer said he wondered if Cisco would compete on this feature.

Cisco would not comment on its product plans at press time.

However, Frank Dzubeck, president of Communications Network Architects, Inc., a Washington consultancy, said, "It is a good implementation; I've seen the documentation."

Ferengi's Windows shortcomings raise red flag

By Stuart J. Johnston and Ed Scannell

PC users considering OS/2 for Windows will encounter incompatibilities if they upgrade from Microsoft Corp.'s Windows to Windows for Workgroups 3.11.

The IBM product, code-named Ferengi, was designed to let Windows 3.1 users easily upgrade to the 32-bit OS/2 without changing any of their system and software configurations.

But internal documents based on Microsoft testing show that OS/2 for Windows will not work on PCs that have either Windows for Workgroups' 32-bit file system or MS-DOS 6.2's DoubleSpace disk compression installed.

For example, OS/2 for Windows will not successfully install on a PC with DoubleSpace because it cannot see the compressed drive, according to the Microsoft memo that describes the company's test results. "Additionally, when installed on top of [Windows for Workgroups], neither the operating system nor any Windows applications would run," the memo continued.

"I think people want to double their hard disks, and they like the 32-bit file access and speed," said Jonathan Roberts, Windows group product manager at Microsoft.

Out in the cold

Such incompatibilities could effectively freeze OS/2 for Windows out of those markets because they eliminate one of IBM's biggest selling points — the product's ability to install right over the top of existing Windows-based systems.

More chilling is the fact that Microsoft recently announced that some 30 PC OEMs, many of which are second-tier companies, will ship both server and desktop machines with only Windows for Workgroups 3.11 and MS-DOS 6.2 on them.

No slouch

OS/2 for Windows appears to be off to a fairly fast start. Company officials said about 100,000 copies shipped in the first four weeks of the product's availability.

But at least one analyst was skeptical about whether the problems would prove to be a barrier for corporate users. "Any corporation that has any intention of using Ferengi is going to have the brains to specify Windows 3.1" instead of Windows for Workgroups, said Matt Cain, program director of workgroup computing strategies at Meta Group, Inc. in Westport, Conn.

"There are 40 million [Windows 3.x] users, and this product is a legitimate option for them. If IBM picks up just 10%, that's 4 million users they would not have had," said Will Zachmann, president of Canopus Research, Inc. in Duxbury, Mass.

Wait and see

IBM officials acknowledge that OS/2 for Windows currently does not work well with Windows for Workgroups. "Until we see more demand for Windows for Workgroups [3.11] in the market, we see no need to rush to support that function," an IBM spokesman said.

At last month's unveiling of OS/2 for Windows, IBM said it would support Microsoft Corp.'s Win32s application programming interface.

This support would let OS/2 for Windows take some advantage of the virtual device drivers in Windows for Workgroups 3.11. IBM officials, however, have yet to spell out whether the company would support all of those virtual device drivers or when that support would be available.

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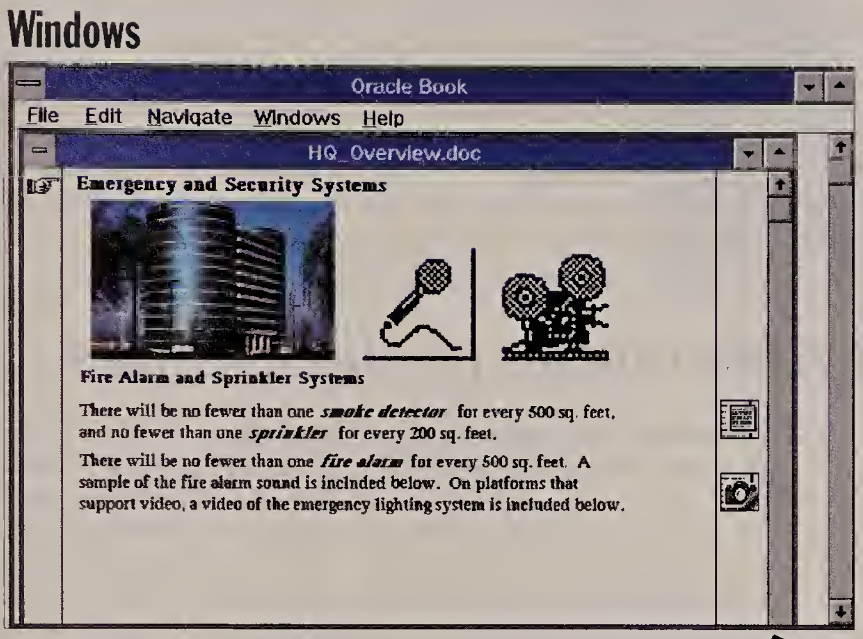

Emergency and Security Systems

Fire Alarm and Sprinkler Systems

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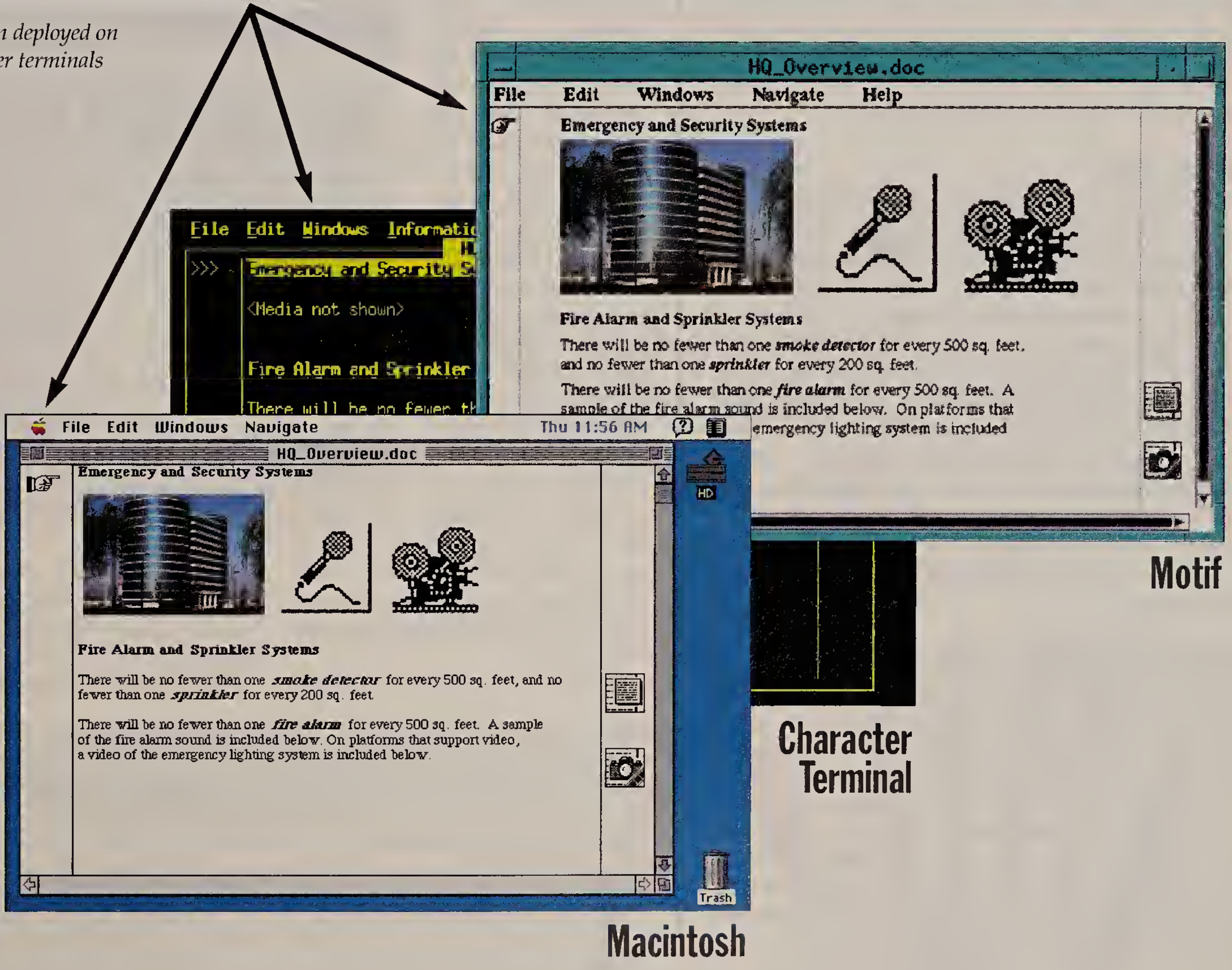
British Telecom, UK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News Shorts

Digital plans DECnet Phase IV phaseout

Digital Equipment Corp. will likely phase out its DECnet Phase IV networking transport after arrival of the next version of the OpenVMS operating system, which is due out in the spring. That would force DECnet Phase IV users to migrate to the newer DECnet/OSI transport or switch to TCP/IP. Larry Walker, vice president of networks engineering at Digital, said a continuation of Phase IV support has not been ruled out, but he added that the company is now spending most of its transport resources on TCP/IP-related products.

Workplace forms due from IBM

IBM is about to enter the burgeoning electronic forms market. It will ship in the next 90 days a FormTalk offering that will be one of the first applications to take advantage of the Workplace Shell on OS/2. This will make it easier for end users to create their own forms, IBM claimed, simply by clicking on various objects. A Windows version is due in mid-1994.

Court rules on EDS' use of CA software

A UK court has ruled that a soon-to-be subsidiary of **Electronic Data Systems Corp.** must limit its access to **Computer Associates International, Inc.**'s software. The ruling followed a disclosure to the court of CA's action against EDS over improper use of its software in the U.S. Under the decision, DVOT Ltd., soon to become an EDS subsidiary, will discontinue its use of CA software over the next four months.

Blue on Blue

IBM's **Integrated Systems Solutions Corp.** (ISSC) outsourcing subsidiary has inked a 10-year, $400 million "technology alliance" deal with **Blue Cross/Blue Shield of New Jersey**. The pact calls for ISSC to take over data processing and help migrate Blue Cross to client/server architectures. Blue Cross Chief Executive Officer William Marino said the contract represents "substantial" cost reductions; but he added that the health insurer's prime motivation was to gain greater access to emerging technologies to help it move into managed health care and compete against larger insurance companies. ISSC is absorbing the 322 information technology staffers at Blue Cross and offering similar or better salaries and benefits, Marino said.

Proteon touts DLSw use, projects loss

Systems integrator **SHL Systemhouse, Inc.** in Ottawa has likely become the first company to use a non-IBM implementation of Data Link Switching (DLSw), which is now supported on its **Proteon, Inc.**-supplied routers. DLSw brings together in a standard way various SNA-in-IP encapsulation features. Proteon, meanwhile, said it intends to report a substantial loss for the fourth quarter ended Dec. 31 and is seeking restructuring guidance from New York investment banker **Lazard Freres**.

SHORT TAKES **Levi Strauss & Co.** said it is transferring computer operations to Dallas to avert possible earthquake damage. A data center insider, however, said the firm is making the move to reduce costs.... **Oracle Corp.** said that for the second quarter ended Nov. 30, revenue increased 28% to $452 million while net income grew by 86% to $62 million.... **Stratus Computer, Inc.** will take a $36.2 million write-off for research and development costs associated with its recent acquisitions of Shared Financial Systems, Inc., BellSouth Systems Integration, Inc. and Distributed Systems, Inc. The onetime charge will be taken in the fourth fiscal quarter, which ended Jan. 2.

PS/2 delays cause minor stir

By Michael Fitzgerald

The IBM PC Co.'s recently disclosed delay in shipping high-end models of the PS/2 is an inconvenience, but not a crisis, customers and partners said.

A PC Co. spokesman attributed the delay to a faulty controller chip meant to improve system performance of follow-on versions of the PS/2 Models 76 and 77. The chip integrates memory, the memory controller, level two cache, the Micro Channel bus controller and a local bus controller. The systems, which were expected to ship in January, are now slated to arrive in March, the spokesman said.

"Yes, it's a concern, but you don't want a product recall, and there's nothing magic that the machines had that they had to come out the second week of January," said Bruce I. Linker, president of the Microcomputer Managers Association and vice president of information systems at a large financial services company.

William Tauscher, chairman of Computerland Corp. in Pleasanton, Calif., said he did not expect to see a backlash against IBM from major corporate accounts. "IBM has gotten very aggressive in making arrangements to substitute for PS/2s, either by beefing up lower-end systems or bringing higher-end systems down to replace orders," Tauscher said.

Still, analysts said the product glitch, coming after lengthy PS/2 backlogs, an inordinately slow design cycle and problems with the ThinkPad 500 subnotebook, has not helped the PC Co.'s image in the market.

IBM revamp further unifies product sectors

CONTINUED FROM PAGE 1

environment for better application portability across platforms.

"This move is about working off your bases and having scalable architectures," said Robert Djurdjevic, president of Annex Research in Phoenix. Djurdjevic said that while it was still too early to tell, "this is perhaps the beginning of a new, consolidated IBM world."

But some said IBM has made similar moves before but with little success.

"Sure it makes sense that IBM is trying to ensure interoperability among the systems, but that's not news. They've been saying that for years," said an information systems executive at a large IBM shop who requested anonymity.

For the most part, however, users welcomed the opportunity to see a more technologically united IBM.

"I don't have a clear path to move from my LAN server to using the mainframe as a server using the [LAN] software, which is what I'd like to do," said Charles H. Naginey, senior director for development and operations at the American Cancer Society in Austin, Texas.

Naginey said IBM's tools for running LAN software on a mainframe are "cost-prohibitive" right now, and this prevents him from using the mainframe as an enterprise-wide server. But, he added, the reorganization puts IBM in a position "to help us make that move" because it looks as though IBM may eventually provide a migration path from the LAN to the mainframe.

Other users questioned how long it would take for the reorganization to actually produce something tangible.

"I think they're heading in the right direction," said Richard Layman, data processing director at Indiana Harbor Belt Railroad in Hammond, Ind. "But it won't buy me anything right away. I'll believe it when I see it."

Big Blue blocks

A restructured IBM breaks out as follows:

Large-Scale Computing Division	Group name to be announced
JOHN THOMPSON Senior vice president and group executive	RICHARD THOMAN Senior vice president and group executive
Large Systems Division NICK DONOFRIO	**IBM PC Co.** BOB CORRIGAN
Advanced Workstation Division (RS/6000) BILL FILLIPS	**Power Personal Systems Division** NOBUO MII
Personal Software Products LEE REISWIG	**Pennant Printing** JIM VANDERSLICE
AS/400 Division DAVE THOMAS	**Prodigy Systems***

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PC appointment gets mixed reviews

Louis V. Gerstner's naming of longtime associate G. Richard Thoman as head of IBM's PC units drew a neutral reaction from observers and numerous comparisons to former Apple Computer, Inc. chairman John Sculley.

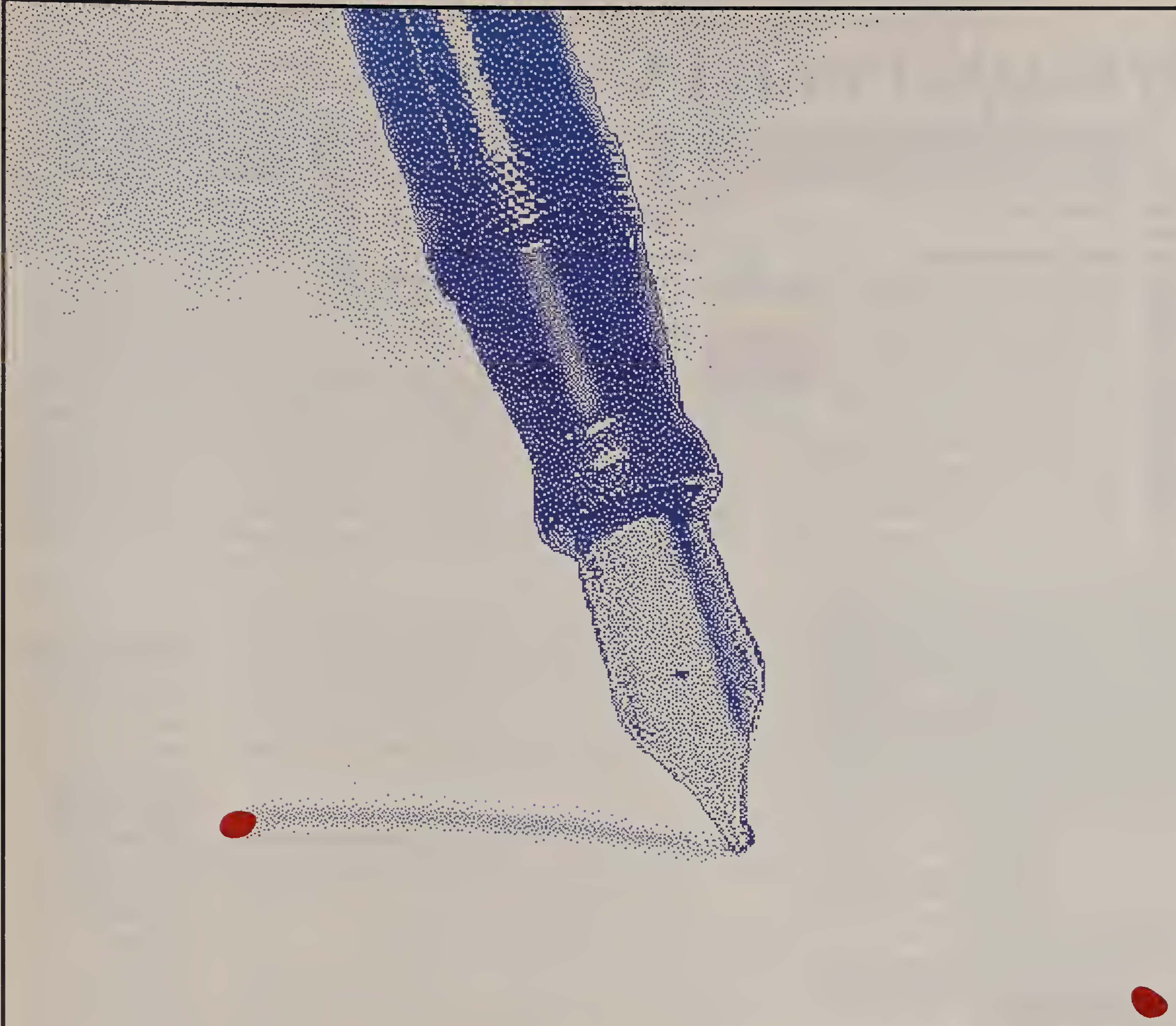
Thoman, like Sculley, is a career marketeer who comes to the PC industry from a consumer products giant, in this case RJR Nabisco, Inc. He will take over many of the PC units handled by James Cannavino, who was promoted to corporate vice president of strategy [CW, Nov. 8].

Gerstner has charged Thoman with preparing the IBM PC business to compete in a predicted consumer boom. Observers and insiders said not to expect the emphasis on consumer markets to distract the units from their core corporate business.

William Tauscher, chairman of Computerland Corp., called Thoman's appointment a rational move. "If you look at the guys making the key decisions, they're traditional IBM born-and-bred blue-suiter types, but not one of them has ever worried about a world with consumers and the retail world."

Thoman will also run IBM's interest in Prodigy Services, Inc., which is a joint venture with Sears, Roebuck and Co. and Pennant Printing, the IBM printing systems company. Pennant, which makes high-end printers oriented toward large systems, was put in Thoman's group to even out responsibilities among unit managers, according to an IBM spokesman.

—Michael Fitzgerald



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Apple ready to talk PowerPC server

By James Daly

Apple Computer, Inc. is expected to detail plans for firing up its server line with the speedy new RISC-based PowerPC chip during briefings for its new PowerShare Collaboration Server software at this week's Macworld Exposition in San Francisco.

Power-starved corporate Macintosh users have already installed Apple's first trio of true dedicated servers — Motorola Inc. 68040-based servers that started shipping in May. These servers will be upgradable to the PowerPC RISC chip. However, some users are still holding out for the added punch of the PowerPC chip.

"I'm not getting rid of my Sun [server] just yet," said James Yip, who supervises more than 3,000 Macintoshes as a manager of technical services at Ernst & Young in Toronto.

Don't look too soon

But don't look for PowerPC-based Macintosh servers too soon. Insiders said Apple will not offer its PowerPC desktop systems until March, and the servers are not expected before the end of the year.

Apple is expected to start with its flagship server, a PowerPC version of the Workgroup Server 95 sporting the 620 microprocessor. The powerful chip is intended for products offering premium performance and a full 64-bit architecture. It will also be used in some workstations.

The currently available Workgroup Server Models 60, 80 and 95 are essentially enhanced versions of the Macintosh high-end Quadra but contain elements to enhance their specialized role as servers. A special processor-direct slot, for instance, helps provide fast hard disk I/O, and a second-level memory cache cuts the time the microprocessor spends getting information from RAM.

Sources familiar with Apple's plans said its PowerPC servers are likely to include several processors. The flagship will be a PowerPC-based version of the Workgroup Server 95 running under the PowerOpen operating system.

Available in June, PowerOpen is a next-generation Unix operating system and one of the bedrock technologies slated to come out of the Apple/IBM technological alliance. Users said they are hoping that the Macintosh's traditional ease of use, coupled with the brawny PowerPC chip, will make it easy to embrace Unix.

Some users said they hope Apple will fix the bugs in the Workgroup Servers on the way to a PowerPC version. Suggestions for improvement range from pleas for better audit trails to simpler issues such as complaints about the key slot.

"When you twist it one way, it locks the machine, but if you twist it the other, it turns it off," said Michael Keithley, who manages a Model 95 as information systems director at Creative Artists Agency, Inc. in Beverly Hills, Calif. "So I have people accidentally turning off the server. That's inexcusable."

Per-user pricing

CONTINUED FROM PAGE 1

based environments.

"Small, medium and large is how [database makers] should do it," said John Morrell, an analyst at International Data Corp.

Strict per-user pricing would "give us more room to make sure we're buying the right size database for each project. I welcome that," said Carl Esposito, regional chairman of the New York Area Oracle Users Group.

One price for one size database, regardless of the hardware for which the system is destined, would "make life a lot simpler," said a project analyst at a major insurance advisory firm in Florida. The company has delayed its go-live schedule for several client/server systems for "at least a quarter, maybe two," because of the complexities and expense involved in buying Oracle, the analyst said.

Database derby

A sampling of database schemes and prices for common product configurations:

DATABASE	PRICE
MICROSOFT SQL SERVER FOR WINDOWS NT	$2,995 for a 10-user system, $995 for a single-user system
IBM DB2/2 FOR OS/2	$425/user
IBM DB2/6000	
FOR RS/6000 MODEL 200 SERIES	$2,000 for a two-user system to $13,000 for 16 or more users
FOR RS/6000 MODEL 900 SERIES	$16,000 for a two-user system to $149,000 for 256 or more users
ORACLE ON HP 9000 SERIES 800 UNIX OR SUN SPARCSERVER 2000	$1,200/concurrent user or $800/named user
ORACLE ON INTEL-BASED PCS RUNNING NETWARE OR OS/2	$600/concurrent user or $500/named user

Pricing pressures

Users are not the only source of pressure for Unix database firms; Microsoft Corp. is putting the squeeze on via aggressive pricing for its workgroup-level SQL Server for the Windows NT database. In some configurations, the product costs 10 times less than comparably sized systems from Oracle.

To be sure, an Oracle database on the Unix system sports more functionality than the smaller SQL Server running on immature Windows NT. But the vast price difference "opened a lot of eyes," said Bill Shattuck, an analyst at Montgomery Securities in San Francisco.

For example, a 50-user Unix-based Oracle 7 database can cost about $42,000, according to Oracle; an unlimited-user version of Microsoft's SQL Server for Windows NT, meanwhile, is priced at $15,000, Microsoft said.

Unix database makers historically have not published prices, preferring instead to arm salesmen with general price guidelines for negotiating with individual users.

But client/server-savvy users dislike having to study a complex price matrix that weighs hardware platform size and model against precise numbers of users for a given application, said David McGoveran, president of consulting firm Alternative Technologies. This can impede the process of rolling out client/server applications, McGoveran said.

Informix's answer is to move to pure per-user pricing for its SE and Online databases, regardless of the hardware on which the systems run. Fees for the high-end Online database are $1,200 per user for a developer's license and $900 per user for runtime licenses, with a five-user minimum.

While Oracle's pricing is comparable when broken down per seat (see chart), it "has been at a disadvantage" without a small, lesser-function database, Morrell said. Informix can afford to go per-user because it will sell its less complex SE product to users looking for smaller configurations, he added. Informix will save the enterprise-level Online database, which is more expensive to develop, for customers with several hundred users or more, he said.

Oracle has no plans to offer straight user-based pricing, said Brett Bachman, vice president of systems product marketing at Oracle. However, the company, which has historically catered to host-centric applications, plans to plug product-line holes with a series of low-end databases. OracleWare is a family of smaller, easier-to-install databases aimed at departmental users. It comes bundled with NetWare and UnixWare from Novell, Inc. Also expected by mid-1994 is a 10-user, under-$3,000 "lite" product — Oracle's LAN Server — to be shrink-wrapped and sold through indirect channels [CW, Dec. 13].

Price considerations

The moves illustrate how important price has become for database users, Shattuck said. Microsoft "made it an issue and Oracle needs to come back at them."

So do other database makers.

ASK plans to "fine-tune" Ingres database fees at month's end, said Beverly Brown, senior product marketing manager. The company condensed pricing to three levels based largely on CPU size in June. However, more changes loom, Brown said, to accommodate features being added to the Ingres database.

For example, Ingres/Replicator, an add-on module for managing distributed systems, will be priced separately rather than as part of the Ingres database license. Replicator would cost every user the same amount of money, no matter how much was spent on the core Ingres database license.

Sybase plans to rethink pricing, despite its tag-team pact with Microsoft (see story below). It plans to go per-user on low-end Novell NetWare database pricing in early 1994.

Changing bases

Continued from page 1

Oracle: Pricing will remain traditional. For example, database license prices are a function of both the number of users and the CPU size. New features are priced as a percentage of database fees. But Oracle's low-end strategy is changing with "lite" databases, some of which will be bundled with Novell NetWare or UnixWare and sold through indirect channels.

Sybase: Largely traditional but plans to go per-user on low-end Novell NetWare database pricing in early 1994.

Tag team

The Sybase and Microsoft plan to capitalize on their joint development pact for SQL Server products by operating as tag-team database marketers might not be as cut-and-dried as they think.

Under their arrangement, Microsoft will go after departmental users who do not require much consulting help and who prefer to buy through resellers, while Sybase will position itself as a database supplier to users deploying high-end, mission-critical client/server applications.

Yet, if Windows NT lives up to its billing as an enterprise operating system, Sybase may find Microsoft increasingly encroaching on its turf at the enterprise level.

What could also complicate matters is the fact that Microsoft has built up consulting and support services as part of an effort to "meet the needs of the higher-level corporate customer," said Gary Voth, group product manager of Microsoft SQL Server.

Robert Epstein, executive vice president at Sybase, acknowledged that "there is potential for overlap" in Sybase and Microsoft's efforts. "Ideally, the customer should be able to pick which [SQL Server version] he wants and Sybase and Microsoft should be relatively neutral," Epstein said. "We're not at that ideal state yet." — *Kim S. Nash*

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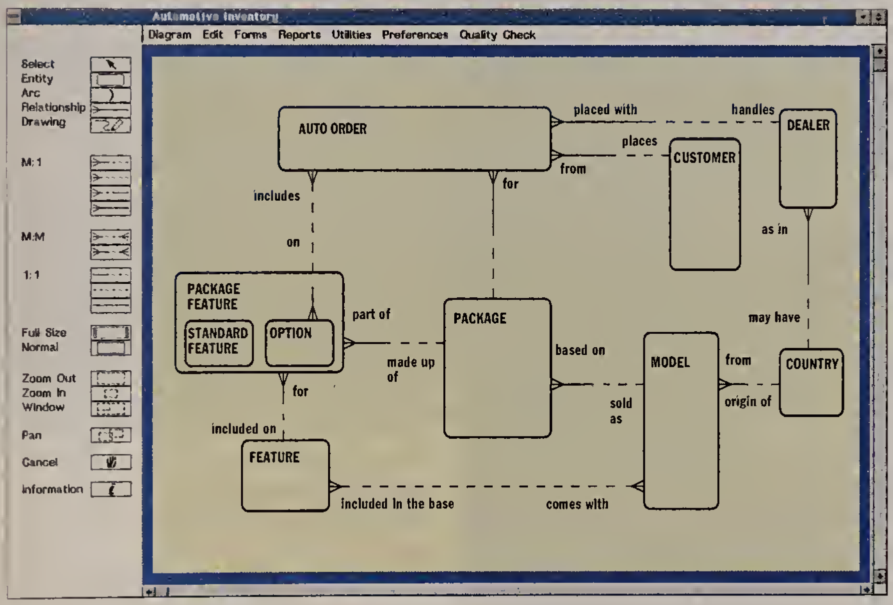

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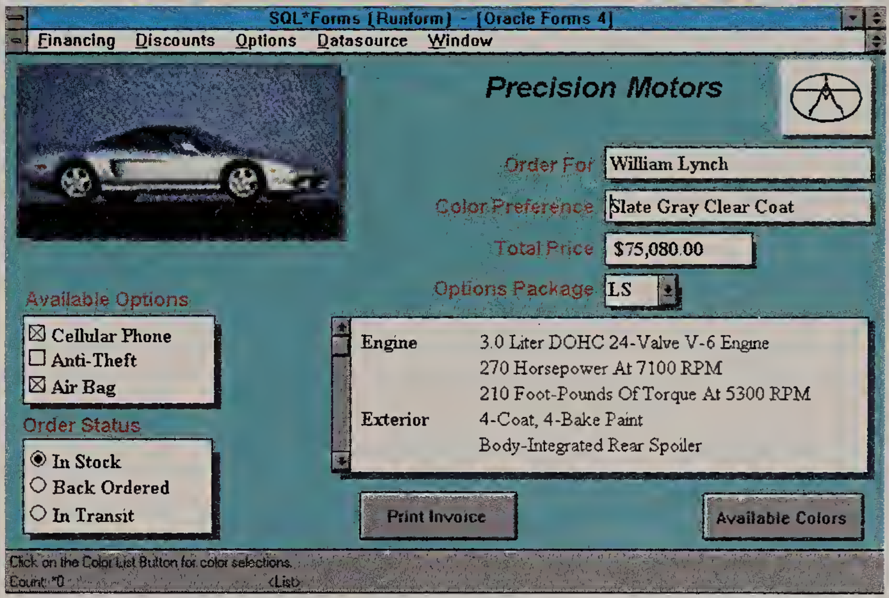

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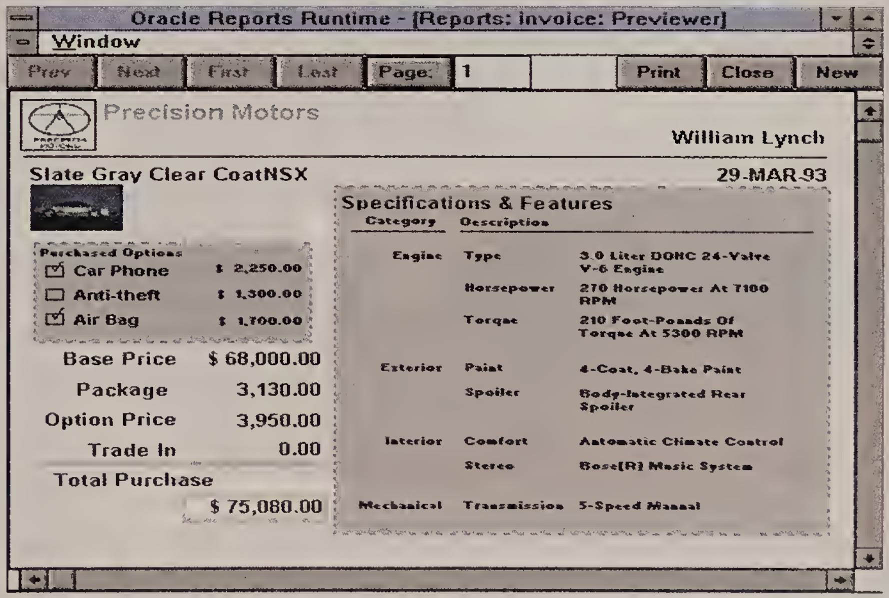

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Real IS payoff lies in business benefits

By Mitch Betts

WASHINGTON

The U.S. service sector's huge investment in information technology during the 1980s produced virtually no gain in productivity, according to government statistics. However, that data misses the real information technology payoff, which came in the form of business benefits such as higher market share and better customer service, according to a major new report by the prestigious National Research Council.

Outside experts agreed with the report, which focuses on the so-called "productivity paradox."

The traditional productivity measure (output per labor-hour) is fine for wheat and steel, but "the way we study productivity is not adequate for the Information Age," said Gordon B. Davis, MIS professor at the University of Minnesota.

Simply put, unless the information systems investment triggers worker layoffs, it does not show up in macroeconomic productivity figures, Davis said. Missing from those calculations, he said, is the role IS plays in improving customer service, inventory management, financial analysis and other business functions, as well as creating new services.

The debate is rooted in the fact that U.S. service industries spent more than $750 billion on IS hardware alone in the 1980s, yet the sector managed a tiny 0.7% average yearly growth in productivity during that time.

Waste, bungling and bad stats

The panel said possible explanations for this paradox include wasteful or mismanaged IS investments, faulty statistical measurement and the possibility that IS-generated productivity gains are offset by other factors or take more time to show up.

After interviewing business and IS executives and citing well-known IS success stories such as Wal-Mart Stores, Inc. and American Airlines, the research committee concluded that information technology has produced positive benefits for the service sector.

That anecdotal evidence is not likely to end the productivity debate, however, since there are also stories of botched IS investments, productivity losses from technical glitches and employees using office PCs for playing games. But the report does show that it is misleading to rely solely on productivity as a measure of IS impact.

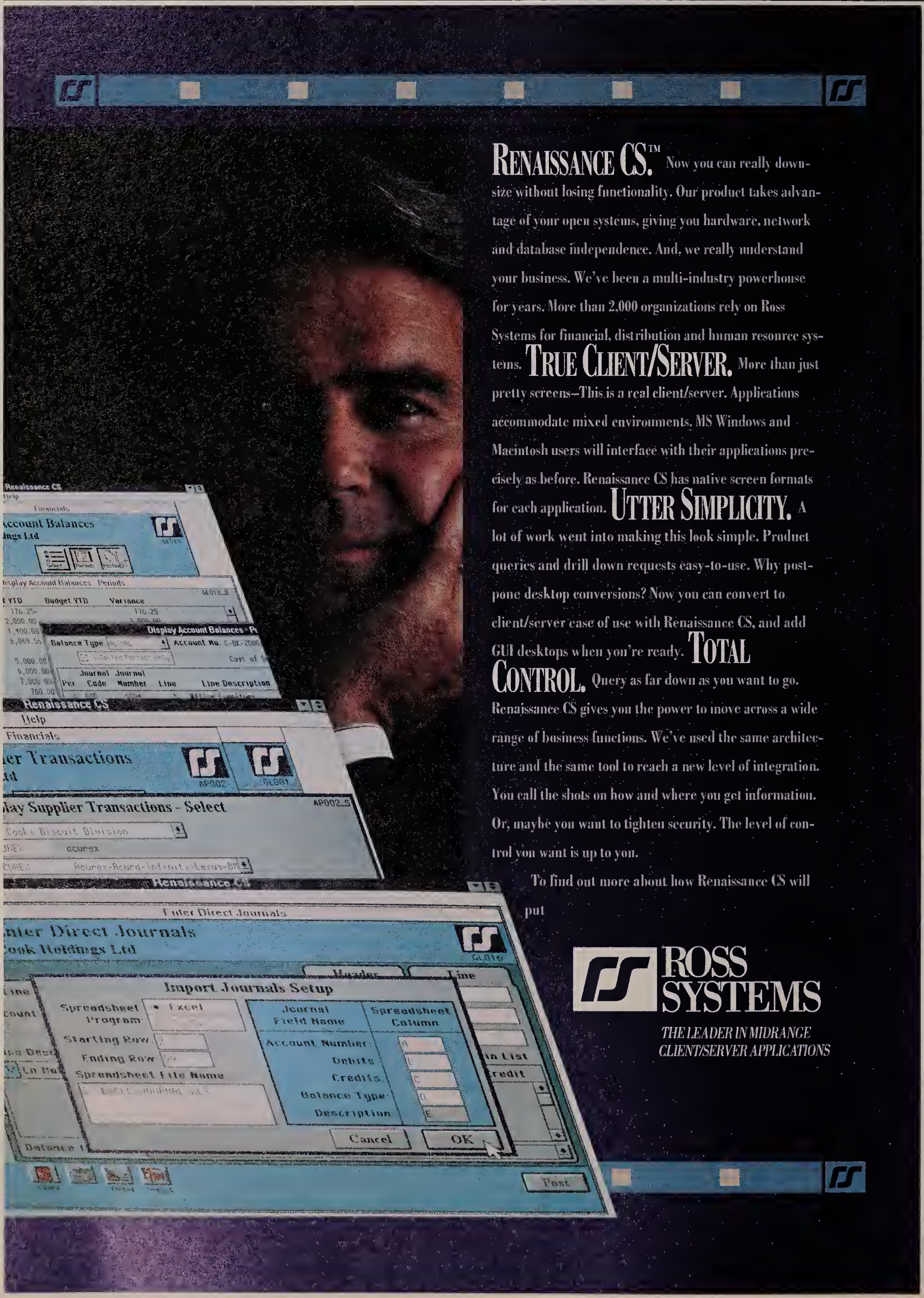
Tough to measure

A classic example of beneficial information technology that does not appear in national productivity figures is the deployment of automated teller machine networks in the 1970s. A study by Brian L. Dos Santos, now at the University of Louisville in Kentucky, showed that "early adopters" such as Citicorp won more market share and profits as a direct result but showed no productivity gain because the company did not reduce costs or labor.

Davis and Dos Santos said the recent wave of layoffs spawned by information technology-enabled business re-engineering projects may boost productivity figures in the next few years.

Many IS executives consider the economists' debate about the IS/productivity link irrelevant, Davis said, because IS executives care more about competitive advantage, financial results and customer service.

Proof that technology pays off remains elusive. See story page 56.



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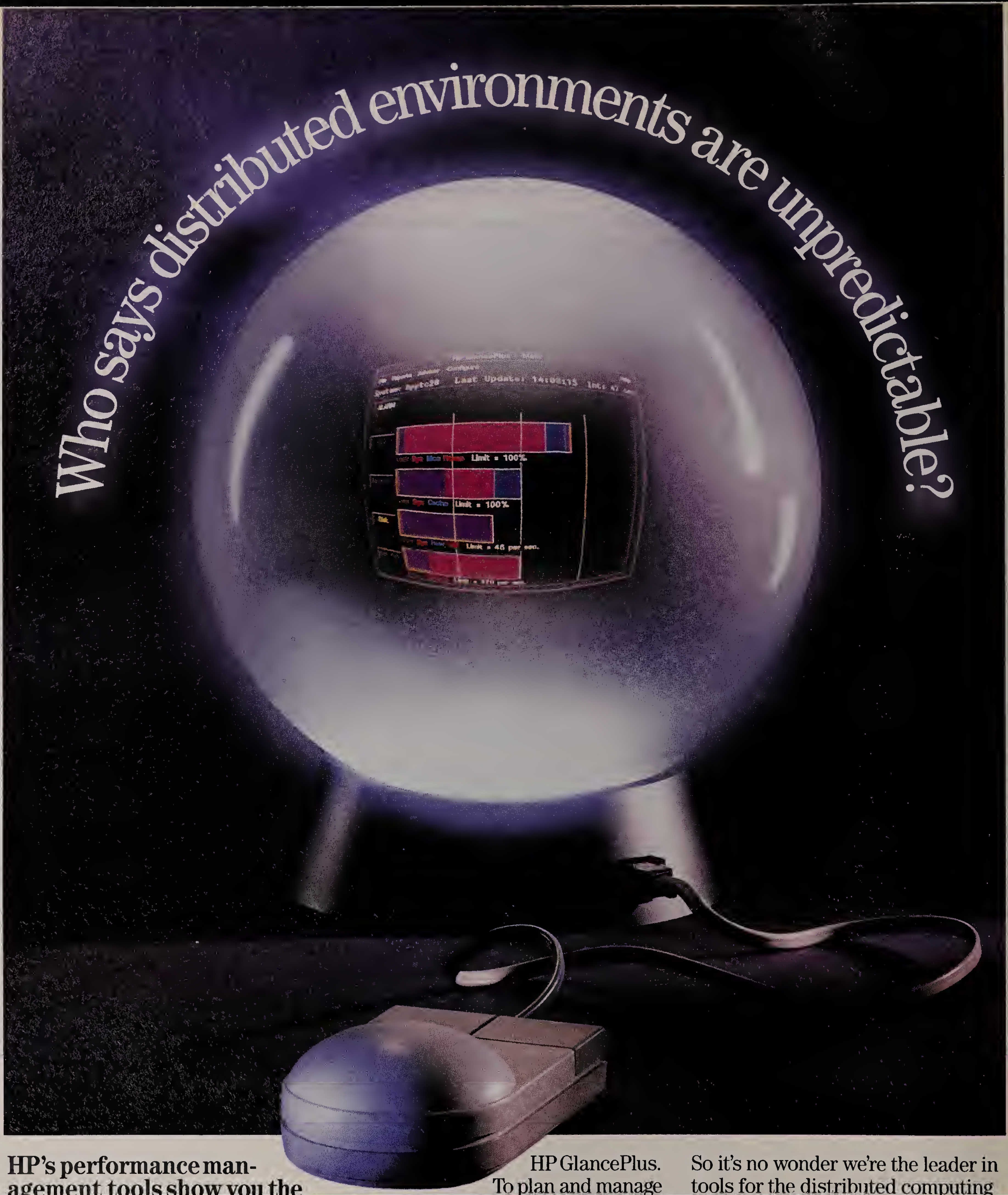

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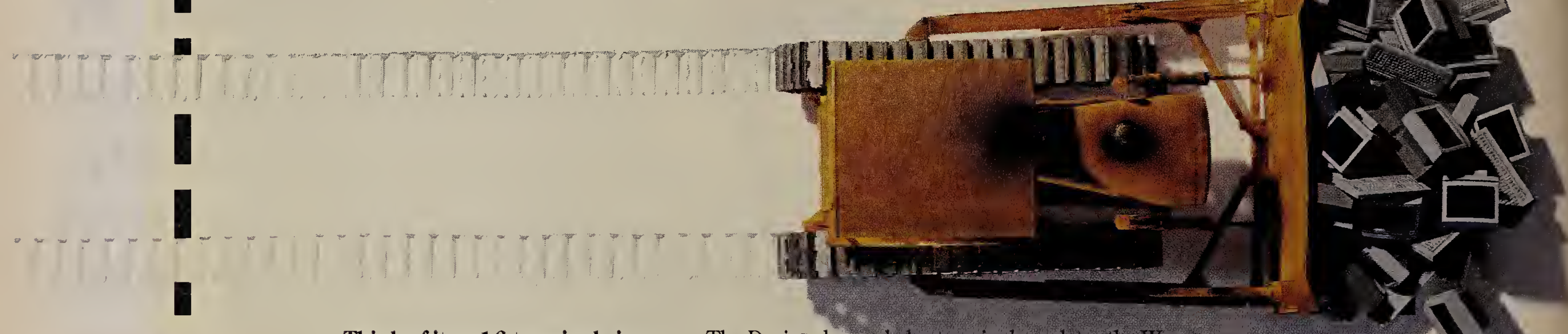

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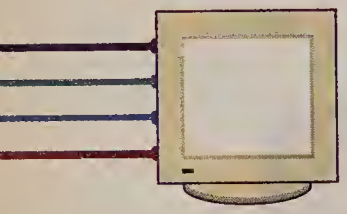
The Disorganization Chart

NO, THINGS ARE NOT GOING TO GO BACK TO "normal." This *is* the norm now — constant adjustment, rising expectations, no rules that last longer than 30 minutes and teams that form, dissolve and reform again around something else. Welcome to 1994. Welcome to competitive collaboration, CIOs without portfolio and end users who haven't got a grain of respect for what you know about any system. Sure, it's hell being an IS executive in this new world of infinite choice, boundless expectations and distributed everything and everyone. But consider the alternative.

IN THIS SECTION



In the land of distributed systems and dispersed business operations, connective technologies will rule. E-mail and EDI are just the beginning.

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NO MORE

It has been a while since you've heard someone talk about "Business as usual," hasn't it? You may never hear it again.

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Outtake

On why those little boxes matter: "Good people in a poor organizational structure will fail, while average people in a good organization are likely to succeed."

N. DEAN MEYER,
IS MANAGEMENT
CONSULTANT

STRUCTURAL CHANGE

Dotted lines and crooked arrows

IS departments don't look (or act) like they used to

BY MITCH BETTS

RATHER THAN AN ORDERLY PYRAMID OF boxes and solid lines, the organizational chart for the information systems function in corporate America is starting to look more like a Rube Goldberg illustration — full of dotted lines and crooked arrows leading into business units.

Corning, Inc., for example, has stationed corporate IS liaison staffers in each business unit. Texaco, Inc. has created a steering committee of business unit IS managers. Wal-Mart Stores, Inc. has reorganized into teams that focus on particular corporate goals.

This blending of the IS organization and business units makes it tough to tell where one starts and the other leaves off, says Jim Metzger, general manager of Texaco's information technology department in Houston. In other words, orderly and strict organizational lines are becoming a thing of the past as IS organizations try to become more nimble in responding to business needs.

NO TWO THE SAME

Because each company responds in different ways to the hot management themes of business alignment, team building and quality management, it seems that no two IS organizational charts look the same. Nevertheless, IS executives and consultants say a few common trends will be at work in 1994:

- **Flatter charts.** The general business movement toward flatter organizations is catching up with IS departments, says Cliff Hallberg, principal at Interpersonal Technology Group, Inc., an IS management consultancy in Rockville Centre, N.Y.

"The IS function is no longer immune from [staff] downsizing, so there are fewer boxes and fewer levels," Hallberg says. As a practical matter, that means fewer middle managers, fewer "assistant directors," less bureaucracy and relatively more hands-on technologists.

- **Skills are king.** Reducing the IS department's head count means that staffers with multiple skills are highly prized. In fact, a revolutionary change is occurring: IS employees advance by adding new skills to their portfolio, rather than by moving up some vertical hierarchy or by seniority, Metzger says.
- **Teams are in.** IS departments are building multiskilled teams for particular projects — especially complex client/server systems — and then disbanding them. Notions of a strict chain of command go out the window when staffers are plucked from the organization chart and inserted into ad hoc, cross-functional teams.

"IS people have to be more generalists than they've been in the past. When you're thinning out the ranks, you need people to be more flexible and create teams as the need arises," says Philip Marzullo, chief information officer at medical equipment vendor Ren Corp. in Nashville.

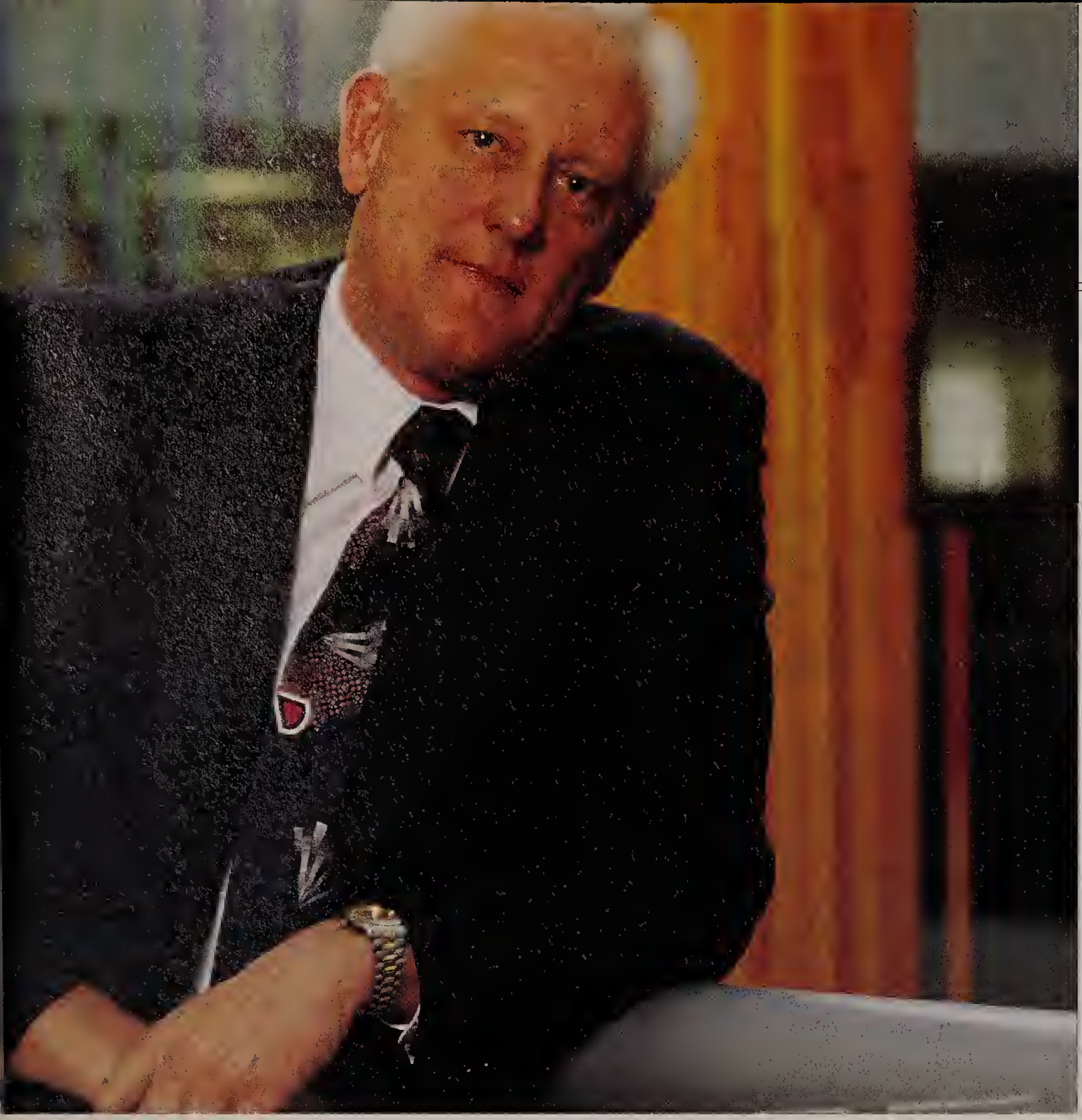
- **New titles.** One result of all these business trends is that IS professionals are sporting a variety of titles not seen in the traditional data processing department, such as team leader, resource manager, quality manager, business process analyst and systems architect.

Perhaps the most dramatic changes in the organization chart come from the continuing swing of the pendulum between centralization and decentralization of the IS function.

The IS function at Great-West Life Assurance Co. in Englewood, Colo., for example, has swung from one end to the other. "If you went back into the early 1980s, we were quite centralized and fairly monolithic in our organization. But then came a fairly drastic decentralization — predominantly of the application development groups," says Jens Pedersen, vice president of IS.

"Now we've decentralized to the point where we no longer recognize the position of a CIO," he says. "Each of our major lines of business has become so autonomous that the IS managers would probably think of themselves as the

PHOTOGRAPHY: PATRICIA BARRY LEVY



> “THIS IS NOT SOME TRANSITIONAL PERIOD. . . . THIS CHAOS IS GOING TO CONTINUE FOR A LONG TIME.”
>
> CLIFF HALLBERG
> INTERPERSONAL TECHNOLOGY GROUP, INC.

CIO for each business line.”

Companies such as Great-West Life decentralize to bring IS folks into closer contact with the business units they serve, but some companies find they cannot abide the loss of data standards, systems integration and economies of scale, so they recentralize or invent some blend of the two.

Take the case of Texaco, which has done all three. In 1988, Texaco decentralized applications development and systems budgets and shipped them out to the autonomous business units, Metzger says. Then in September 1992, Texaco recentralized the operation and support of client/server systems.

Now Texaco has an IS committee, which Metzger chairs, made up of all of the IS directors in the business units, and they jointly manage the company’s overall IS efforts.

Computerworld’s Forecast survey of IS executives finds three-quarters saying their departments are centralized, but there is substantial adoption of alternative structures, too. The survey indicates that 17% of IS organizations are decentralized, 13% are organized around business lines or functions, 12% are organized into teams and 11% are geared to key business goals.

> **DECENTRALIZATION to the max is now a way of life for Jens Pedersen, vice president of IS at Great-West Life. IS managers in each business line are so autonomous they function like CIOs.**

Some might wonder whether the organizational chart really matters, figuring that a charismatic leader and a well-motivated staff can get the job done regardless of how the boxes are laid out.

But N. Dean Meyer, president of IS management consultancy NDMA, Inc. in Ridgefield, Conn., contends that the organizational chart can spell the difference between IS success and failure.

Meyer argues that even the best employees will be set up to fail if the organizational structure does not give them clear, unambiguous missions and incentives. For example, he says, many IS organizations make the mistake of dispersing applications developers to the business units and asking them to be both technologists and strategic business consultants. The result is that neither mission is carried out.

The two missions should be split, Meyer says, with a centralized group of technologists supplying the technical expertise and a group of consultants dedicated to helping each business unit exploit the technology. “Consultancy is a full-time job, not something to be done by technology managers in their spare time,” he says.

IN-HOUSE SPECIALISTS AT YOUR SERVICE

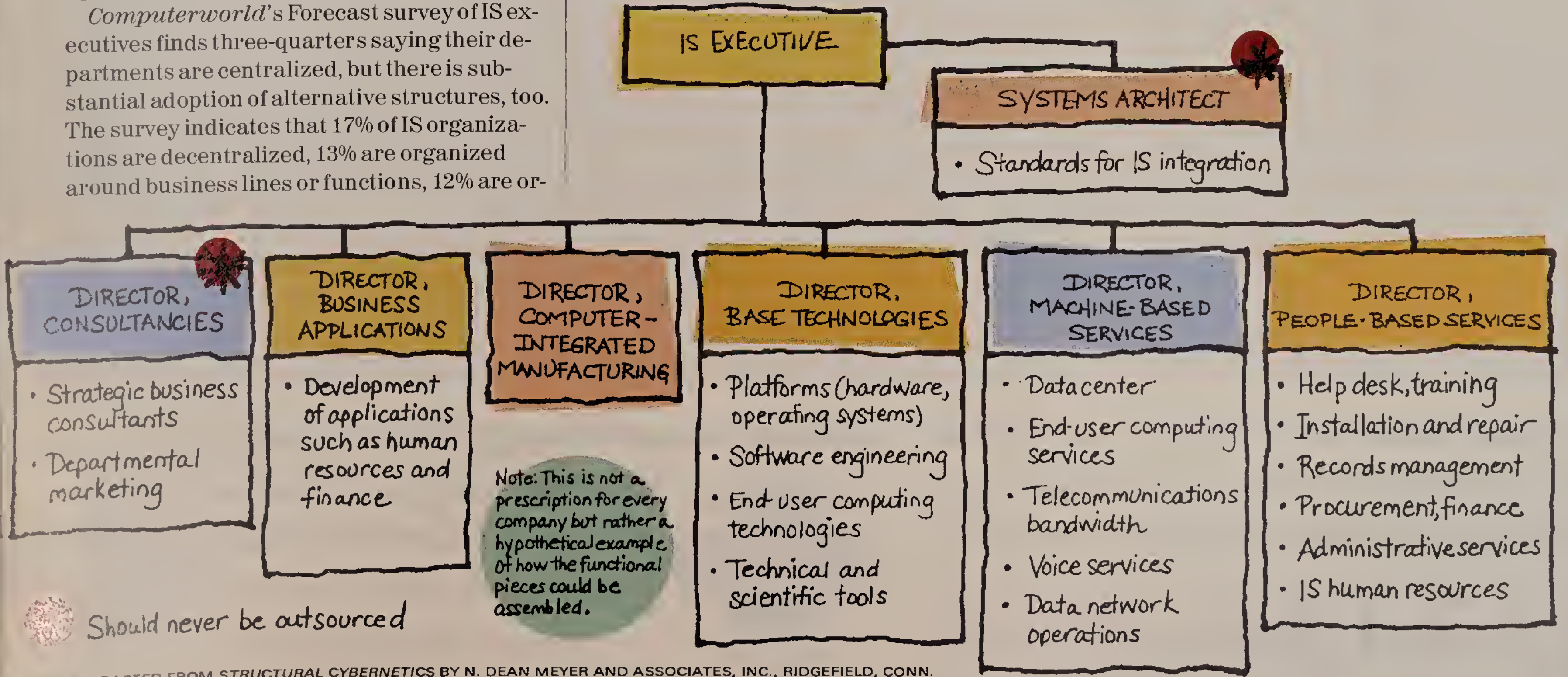
The Tennessee Valley Authority (TVA) in Knoxville has already begun to implement this sort of new-wave IS structure. The TVA found that having IS units devoted to each business unit spread the staff expertise too thin and created redundant, incompatible systems.

So the TVA created a central pool of technical specialists, essentially in-house subcontractors for IS development projects anywhere in the agency. Separate from these technologists is a new group of business-oriented consultants who can suggest IS applications without any bias toward one technology or another, says Robert L. Yates, vice president for information services.

The emphasis is on using the organizational chart to *clarify* roles and eliminate conflicts of interest. For example, the TVA’s recent reorganization creates “service bureaus” to handle the data center, network operations, PC user support and IS administrative functions. A new office of “information technology architects” oversees corporatewide technology standards.

Will the swinging of the pendulum between centralization and decentralization ever settle down? Hallberg sees no evidence that it will.

“This is not some transitional period to level ground. This chaos is going to continue for a long time,” Hallberg says, suggesting that IS executives can expect to be redrawing their organization charts for years to come. ●


IS EXECUTIVE
SYSTEMS ARCHITECT
• Standards for IS integration
DIRECTOR, CONSULTANCIES
• Strategic business consultants
• Departmental marketing
DIRECTOR, BUSINESS APPLICATIONS
• Development of applications such as human resources and finance
DIRECTOR, COMPUTER-INTEGRATED MANUFACTURING
DIRECTOR, BASE TECHNOLOGIES
• Platforms (hardware, operating systems)
• Software engineering
• End user computing technologies
• Technical and scientific tools
DIRECTOR, MACHINE-BASED SERVICES
• Data center
• End-user computing services
• Telecommunications bandwidth
• Voice services
• Data network operations
DIRECTOR, PEOPLE-BASED SERVICES
• Help desk, training
• Installation and repair
• Records management
• Procurement, finance
• Administrative services
• IS human resources
Note: This is not a prescription for every company but rather a hypothetical example of how the functional pieces could be assembled.
Should never be outsourced

SOURCE: ADAPTED FROM *STRUCTURAL CYBERNETICS* BY N. DEAN MEYER AND ASSOCIATES, INC., RIDGEFIELD, CONN.

HOT SEAT

The CIO position remains one of the hot seats in corporate America.

Deloitte & Touche’s most recent study of CIO turnover found that the percentage of new CIOs rose 25%, from 14% to 17.5%. One-third of all CIOs who left their jobs were dismissed or demoted.

Their replacements aren’t likely to fare any better: The tenure of a newly hired CIO averages 18 to 24 months.

WHAT SUCCEEDS

FACTORS IMPORTANT TO CIO SUCCESS

Respondent base: 122 health care CIOs

Managing expectations	64%
People/ Communications skills	48%
Strategic vision	41%
Information technology knowledge	38%
Understanding of (business) issues	37%

WHAT DOESN’T

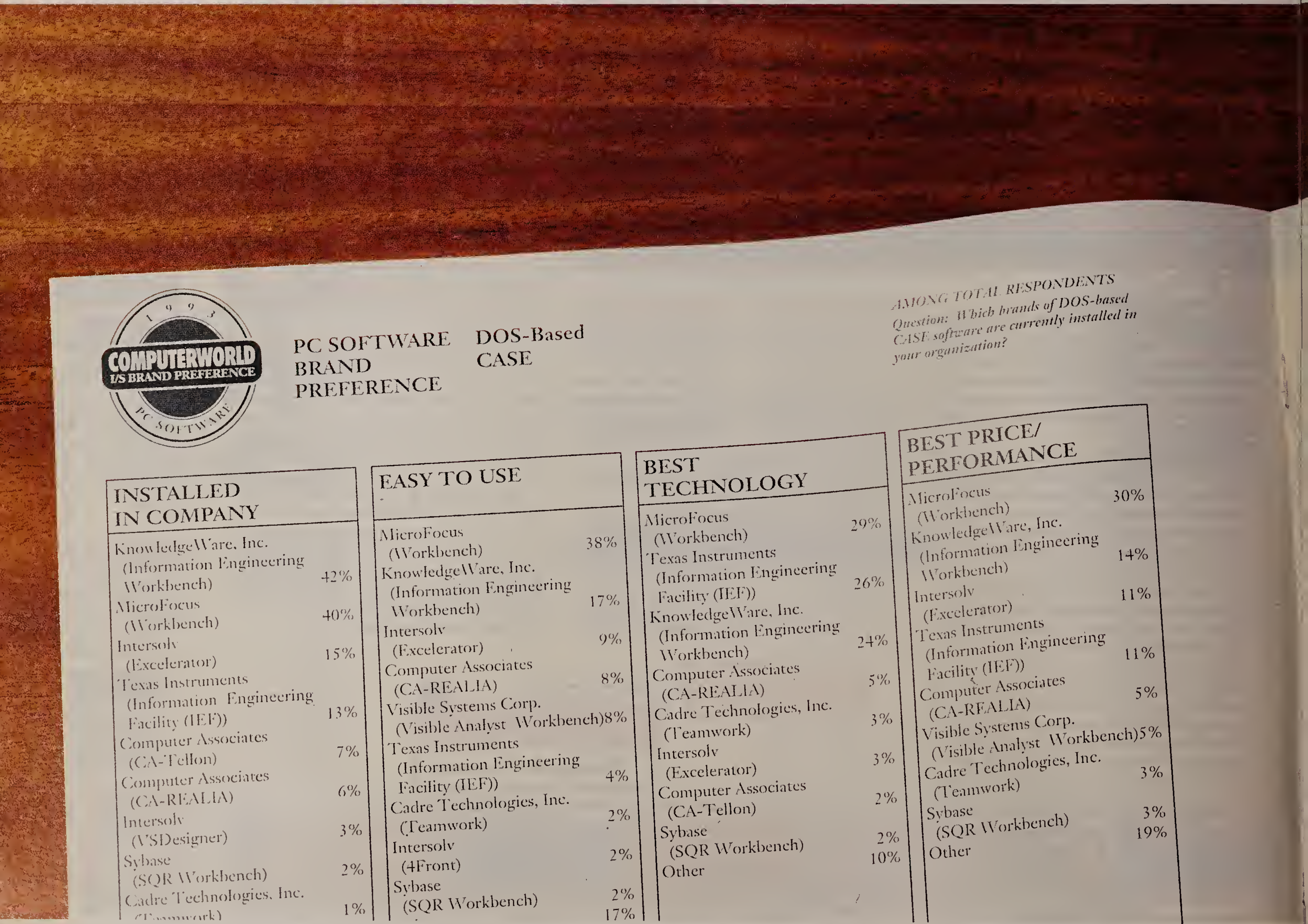
FACTORS THAT LEAD TO CIO TURNOVER

Respondent base: 122 health care CIOs

Not producing/ Exceeding budget	64%
Lack of business/ management skills	48%
Lack of communication skills	41%
Not understanding organization	38%
Unrealistic expectations	37%

Source: College of Healthcare Information Management Executives, Ann Arbor, Mich.; Hersher Associates, Northbrook, Ill.

We didn't say CO
is the best in the



1993 COMPUTERWORLD I/S BRAND PREFERENCE PC SOFTWARE

PC SOFTWARE BRAND PREFERENCE

DOS-Based CASE

AMONG TOTAL RESPONDENTS
Question: Which brands of DOS-based CASE software are currently installed in your organization?

INSTALLED IN COMPANY	
KnowledgeWare, Inc. (Information Engineering Workbench)	42%
MicroFocus (Workbench)	40%
Intersolv (Excelerator)	15%
Texas Instruments (Information Engineering Facility (IEF))	13%
Computer Associates (CA-Tellon)	7%
Computer Associates (CA-REALIA)	6%
Intersolv (VSDesigner)	3%
Sybase (SQR Workbench)	2%
Cadre Technologies, Inc. (Teamwork)	1%

EASY TO USE	
MicroFocus (Workbench)	38%
KnowledgeWare, Inc. (Information Engineering Workbench)	17%
Intersolv (Excelerator)	9%
Computer Associates (CA-REALIA)	8%
Visible Systems Corp. (Visible Analyst Workbench)	8%
Texas Instruments (Information Engineering Facility (IEF))	4%
Cadre Technologies, Inc. (Teamwork)	2%
Intersolv (4Front)	2%
Sybase (SQR Workbench)	2%
	17%

BEST TECHNOLOGY	
MicroFocus (Workbench)	29%
Texas Instruments (Information Engineering Facility (IEF))	26%
KnowledgeWare, Inc. (Information Engineering Workbench)	24%
Computer Associates (CA-REALIA)	5%
Cadre Technologies, Inc. (Teamwork)	3%
Intersolv (Excelerator)	3%
Computer Associates (CA-Tellon)	2%
Sybase (SQR Workbench)	2%
Other	10%

BEST PRICE/ PERFORMANCE	
MicroFocus (Workbench)	30%
KnowledgeWare, Inc. (Information Engineering Workbench)	14%
Intersolv (Excelerator)	11%
Texas Instruments (Information Engineering Facility (IEF))	11%
Computer Associates (CA-REALIA)	5%
Visible Systems Corp. (Visible Analyst Workbench)	5%
Cadre Technologies, Inc. (Teamwork)	3%
Sybase (SQR Workbench)	3%
Other	19%

We've always believed Micro Focus COBOL Workbench® is the best in the world. Now you've confirmed it by unequivocally placing it first in the 1993 *Computerworld PC Software Brand Preference* survey.

You voted COBOL Workbench as **Best Technology** and **Easy to Use**. That's not all. Workbench also won top honors in **Price/Performance, Best Documentation, Plan to Buy**, and most importantly, you chose Micro Focus as the company you **Prefer to do Business With**. According to you there was no contest.

Not surprising really. There is no better technology for developing new systems or

CASE COMPUTERWORLD I/S BRAND PREFERENCE 1993 DOS-BASED

BEST TECHNOLOGY

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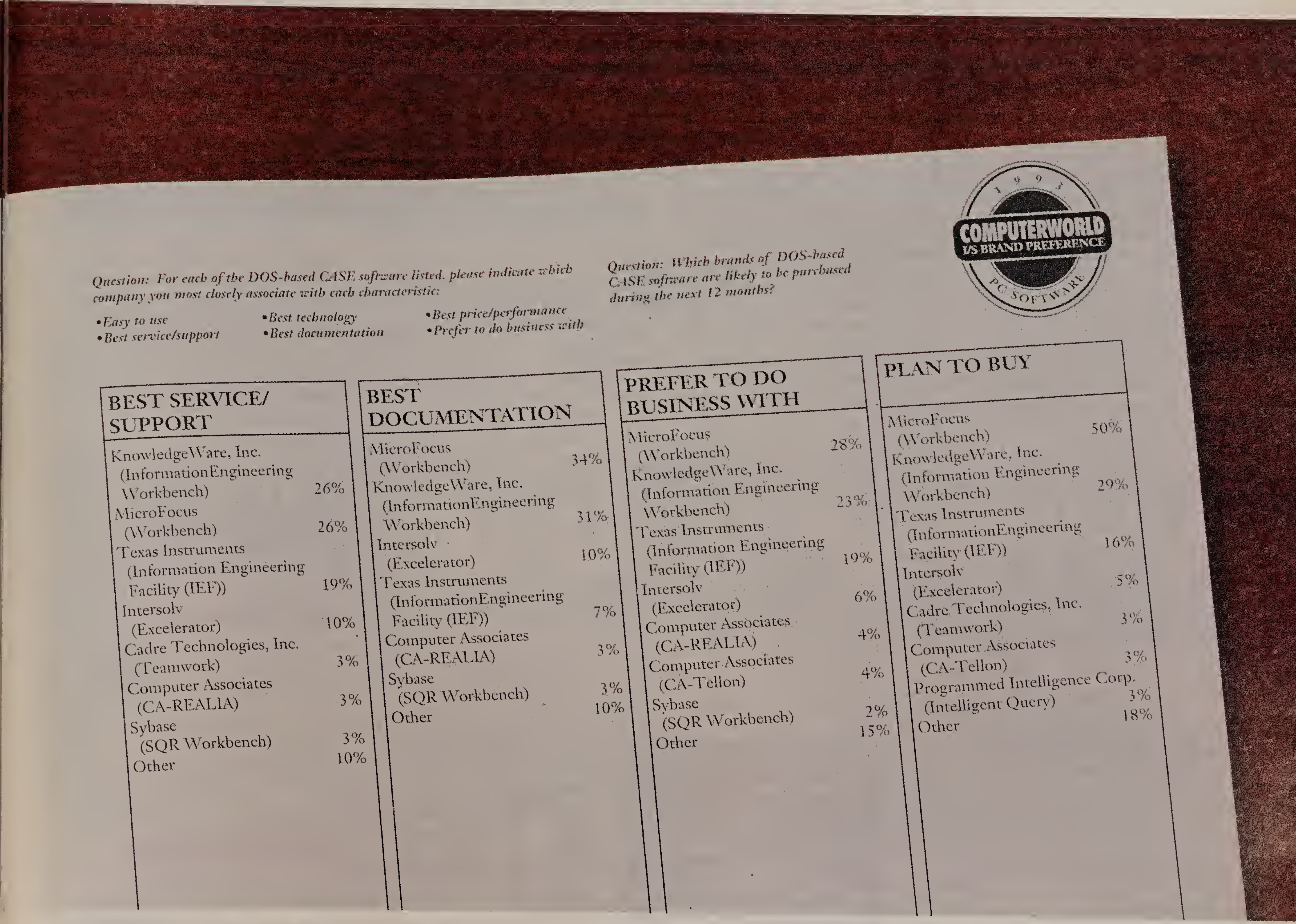
BOL Workbench world. You did.



1993 COMPUTERWORLD I/S BRAND PREFERENCE PC SOFTWARE

Question: For each of the DOS-based CASE software listed, please indicate which company you most closely associate with each characteristic:

- *Easy to use*
- *Best service/support*
- *Best technology*
- *Best documentation*
- *Best price/performance*
- *Prefer to do business with*

Question: Which brands of DOS-based CASE software are likely to be purchased during the next 12 months?

BEST SERVICE/ SUPPORT	
KnowledgeWare, Inc. (InformationEngineering Workbench)	26%
MicroFocus (Workbench)	26%
Texas Instruments (Information Engineering Facility (IEF))	19%
Intersolv (Excelerator)	10%
Cadre Technologies, Inc. (Teamwork)	3%
Computer Associates (CA-REALIA)	3%
Sybase (SQR Workbench)	3%
Other	10%

BEST DOCUMENTATION	
MicroFocus (Workbench)	34%
KnowledgeWare, Inc. (InformationEngineering Workbench)	31%
Intersolv (Excelerator)	10%
Texas Instruments (InformationEngineering Facility (IEF))	7%
Computer Associates (CA-REALIA)	3%
Sybase (SQR Workbench)	3%
Other	10%

PREFER TO DO BUSINESS WITH	
MicroFocus (Workbench)	28%
KnowledgeWare, Inc. (Information Engineering Workbench)	23%
Texas Instruments (Information Engineering Facility (IEF))	19%
Intersolv (Excelerator)	6%
Computer Associates (CA-REALIA)	4%
Computer Associates (CA-Tellon)	4%
Sybase (SQR Workbench)	2%
Other	15%

PLAN TO BUY	
MicroFocus (Workbench)	50%
KnowledgeWare, Inc. (Information Engineering Workbench)	29%
Texas Instruments (InformationEngineering Facility (IEF))	16%
Intersolv (Excelerator)	5%
Cadre Technologies, Inc. (Teamwork)	3%
Computer Associates (CA-Tellon)	3%
Programmed Intelligence Corp. (Intelligent Query)	3%
Other	18%

re-engineering existing applications on the workstation. Programmers find Workbench puts them directly in control of their development environment, delivering quality business applications on time and on budget.

CASE COMPUTERWORLD I/S BRAND PREFERENCE DOS-BASED EASY TO USE

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ENABLING TECHNOLOGIES

Holding it all together

Users get creative in applying communications to bind buyers and suppliers

BY MARK HALPER

THE EMERGENCE OF "GLUE" TECHnologies, such as electronic mail, enhanced electronic data interchange (EDI) and electronic bulletin boards, is not only enabling companies to tie together far-flung national and global offices but is also enhancing customer-to-supplier communications.

Now that electronic interchange of invoices and purchase orders has become common, firms are finding other ways to tighten the link to trading partners.

One tactic that is gaining ground is the sharing of databases with suppliers and corporate collaborators, says David Taylor, vice president of electronic commerce at Gartner Group, Inc., a consultancy in Stamford, Conn. "When you're building something big like a Boeing 747, where many companies participate — and a change to one component affects other components — it really helps if they all can have real-time access to a shared database." In fact, Taylor notes, Boeing is using such a shared database for construction of its new 777 aircraft.

GLOBAL DATA SHARING

Nike, Inc. carries information sharing even further — all the way to Korea. The Beaverton, Ore., shoe and apparel manufacturer sends production data from a home-office database to subcontractors in that country via TCP/IP connections, according to Torrey Byles, an analyst at Input in Mountain View, Calif.

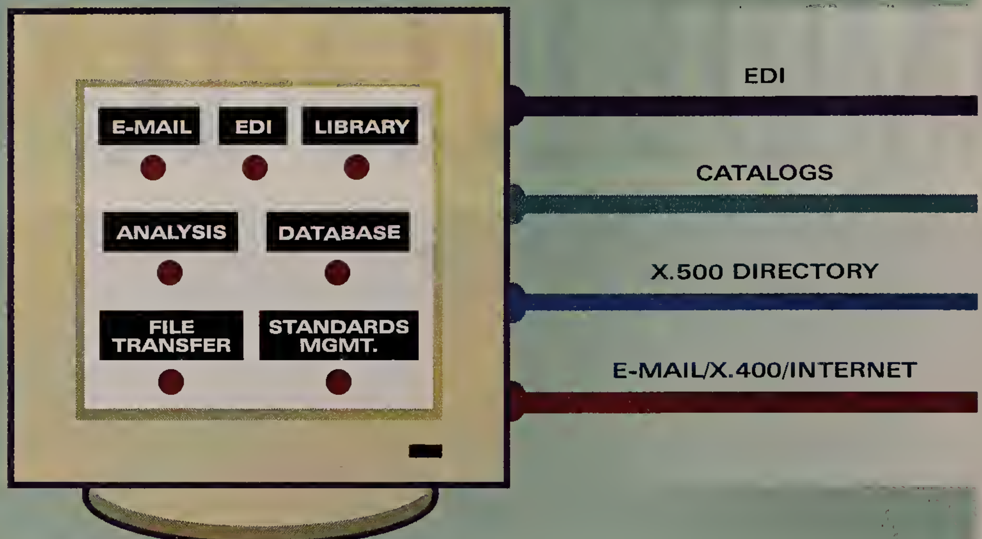
"You're seeing this kind of thing a lot in the manufacturing, high-technology and apparel industries," Byles observes.

Similar connective strategies are also being employed in retailing. Wal-Mart Stores, Inc. in Bentonville, Ark., provides its suppliers with decision-support software that can access data stored on a Wal-Mart Teradata Corp. machine in Bentonville. With this tool, suppliers are able to stay abreast of how their products sell at stores in different markets.

"There's a lot of things we're doing that go beyond traditional EDI," says Wal-Mart strategy manager Charlie McMurtry. "We believe strongly in sharing information and technology with our vendors."

Connection engine

Integrated Electronic Commerce Workstations similar to the one shown are starting to find their way into business



SOURCE: GARTNER GROUP, INC., STAMFORD, CONN.

Gordon Kerr, senior vice president at Hyatt Hotels Corp., says the need for vendor-to-customer communication technology is so universal that industries should cooperate in developing standard mechanisms.

"Right now, as a country, we're not good at those cooperative efforts," Kerr says. "People are always running around trying to reinvent the same systems."

But Kerr also cautions against getting caught up in the euphoria about technology's potential to cement relationships and hold together far-flung alliances.

"Technology as glue is the kind of aphorism people use in boardrooms to justify a $20 million network or a $40 million distributed system project," he says. ●

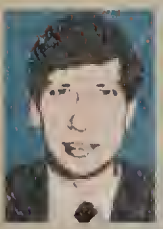
Where the jobs are

The work is changing and so are the skill requirements

WHAT DO EMPLOYERS WANT? A LOT:

"I'd like someone who can program in dBase, handle network support in a Novell environment, has a basic understanding of data communications, wide-area networks, and who can use Windows in a networked environment."

RICHARD STOCKE, IS MANAGER,
KEMP, SMITH, DUNCAN & HAMMOND,
EL PASO, TEXAS



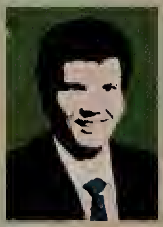
"CASE tools, client/server technologies, SQL server environments and knowledge of distributed applications."

JOHN STEVENS, SYSTEMS MANAGER,
SEA-LAND SERVICES, INC
ELIZABETH, N.J.

Big demand + small supply = opportunity

- Client/server developers
- C++ programmers specializing in business applications
- Programmer/Analyst with EDI experience
- 4GL analysts
- DB2 programmers/analysts with database administration experience
- OS/2 programmer/analysts
- Network administrators with Novell, LAN Server, Token Ring and Ethernet experience

ADJUSTING TO THE TIMES:



"It used to be that when you were beeped at 2 in the morning, you knew where to look for the problem — it was in a single system that you could rip apart. Now, it's more of a networking and communications problem, involving much more detective work."

DONALD KEITH BURLESON,
DATABASE ADMINISTRATOR,
LAWYERS COOPERATIVE PUBLISHING,
ROCHESTER, N.Y.

To do and not to do

Network and data center personnel were asked what skills to emphasize and de-emphasize

PERCENT OF RESPONDENTS

Network personnel

PAY MORE ATTENTION TO:	
Performance metrics	40%
Disaster recovery	29%
PAY LESS ATTENTION TO:	
Ordering of network operating systems, bridges, routers, wiring	38%
Implementation	36%

Data center personnel

PAY MORE ATTENTION TO:	
Gateway management	80%
Network operations	60%
PAY LESS ATTENTION TO:	
DBMS index selection	22%
DBMS help desk support	21%

BASE: 150 INFORMATION SYSTEMS PROFESSIONALS
SOURCE: GARTNER GROUP, INC., STAMFORD, CONN.

How Did World Airways Re-route Their PC Network To TCP/IP?

The answer: PC-NFS® from SunSelect, the world's most popular software for connecting PCs to TCP/IP networks. Whether you use MS-DOS® or Microsoft® Windows, you can connect to any UNIX,® IBM® or VMS™ environment for a true open system solution. And because SunSelect is a Sun Microsystems, Inc. business, you know you're getting the best with PC-NFS.

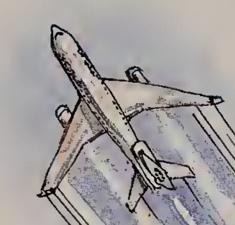
An air traffic controller's worst nightmare.

World Airways' old mainframe "hub" was struggling to handle the company's large volume of PC user traffic: an ad hoc query typically took *over three days.* Unhappy users were stuck in a holding pattern, and productivity was grounded.

World Airways needed to replace the old mainframe and upgrade to a UNIX client/server solution that could link every computer directly to the servers. And that solution included PC-NFS software: It connected all 150 PCs and 26 remote users to a new TCP/IP network in a snap.

PC-NFS

The TCP/IP network solution for PCs.



Up and flying in under a week.

PC-NFS saved World Airways time, because it was fast and easy to install; money, because it utilized existing hardware; and overhead, because it reduced system costs by 45%. More importantly, PC-NFS dramatically *increased* PC user productivity by providing PC desktop access to a wide variety of UNIX-based payroll, accounting and air transport applications – for example, PC-NFS let employees use the UNIX network as a gateway to on-line services like Lexis™ and Nexis.™ And because it's completely transparent, users can't tell whether they're working locally or on the server.

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- 17 resident PostScript fonts
- Adobe PostScript L2, PCL4 support
- Serial, parallel, AppleTalk all active

PrintServer 17/600 Includes
- Ethernet-DECnet & TCP/IP support
- 17ppm, 600 x 600 dpi
- 43 resident PostScript fonts
- Auto-emulation sensing
- Adobe PostScript L2, PCL5 support

PrintServer 32 Includes
- Ethernet-DECnet & TCP/IP support
- 32ppm, 300 x 300 dpi
- 11x17 documents
- 3000 page capacity
- 20-bin mailbox (opt.)

To Work

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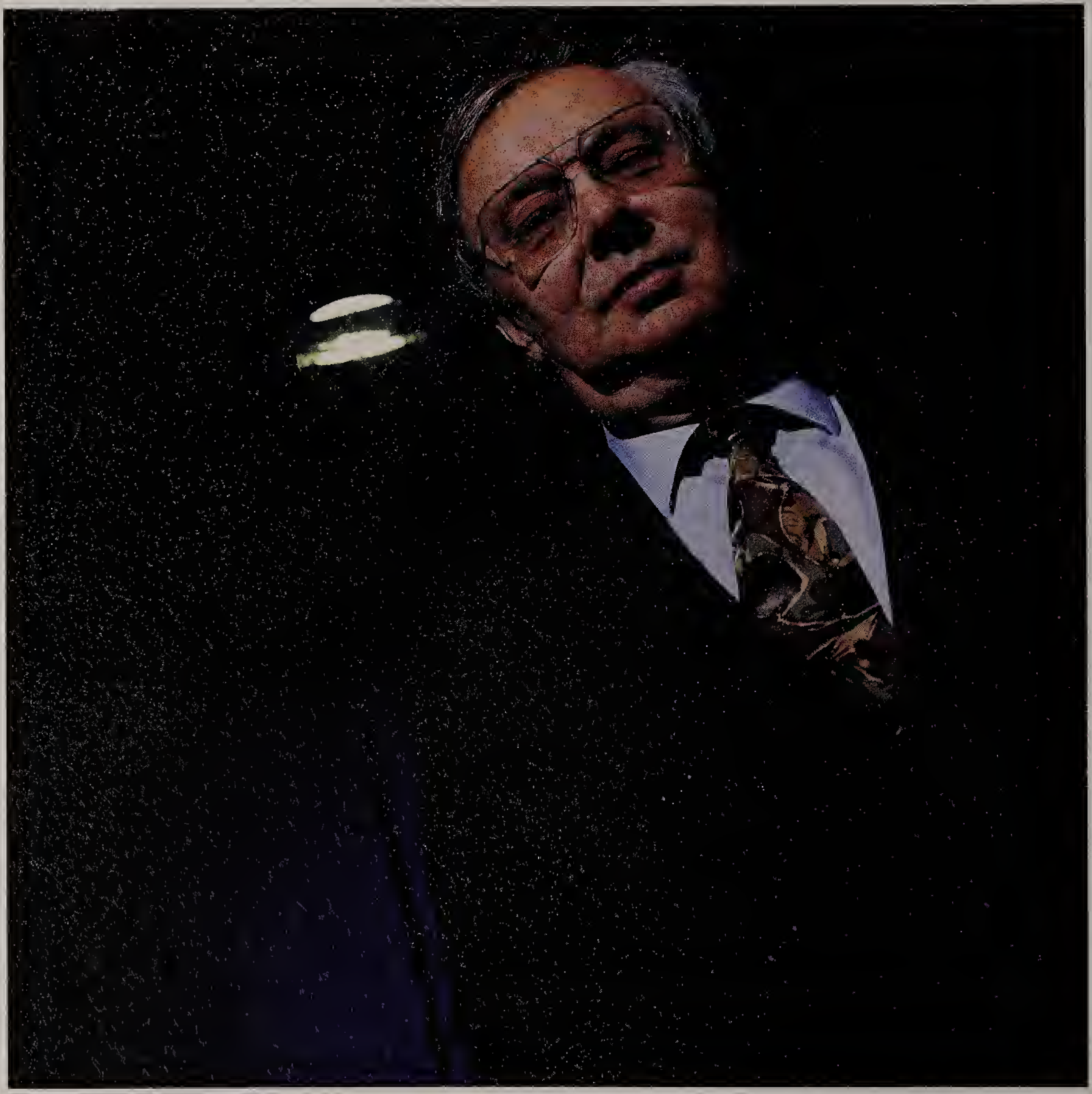
THE EVOLVING ENTERPRISE

“Business as usual” NO MORE

Corporations are depending on IS to help them adapt

BY **ALLAN E. ALTER**



SUPPLYING PRODUCT ISN'T ENOUGH ANYMORE. Ivars Eichvalds of Scotch Maid says retailers will soon ask manufacturers to shoulder responsibility for keeping shelves full.

IT'S NO FLUKE THAT THE BEST-selling business book in 1993, *Reengineering the Corporation*, was written by a couple of consultants previously known only to information systems professionals.

Unlike the boom years of the 1980s, when speculators such as Ivan Boesky and Donald Trump became best-selling authors, the 1990s are a time of harsh realities such as sluggish economic growth. As Citicorp Chairman John Reed told a Boston audience recently, most companies can no longer expect to boost their bottom line by expansion. Instead, they must do it by achieving operational excellence at minimum cost.

This is what re-engineering, and other approaches that businesses are pursuing, promise to deliver.

SLASH CYCLE TIMES

Companies are slashing the time required to take a product from concept to finished goods and from the factory floor to the store.

Consider: A couple of years ago, a new car model was the end result of a 48- to 50-month process. Now some automakers, such as Ford Motor Co., have whittled the interval down to 24 to 36 months. And retailers such as Wal-Mart Stores, Inc. and Kmart Corp. now routinely ask suppliers to replenish their shelves in three to five days instead of three to five weeks.

Accelerating product development has been the focus of re-engineering efforts in the pharmaceuticals industry.

Service providers are also keenly interested in cycle time reduction. Federal Express Corp. has even funded a new academic center devoted to the study of cycle time reduction at Memphis State University in Tennessee.

DELIGHT TOUGH CUSTOMERS

Quality has come to be defined not just as zero defects, but as meeting or exceeding customer requirements. In total quality management jargon, that's called “delighting the customer.”

But customers are getting tougher to delight. Quality and responsiveness are no longer sufficient.

For example, major corporations are whittling their supplier lists and demanding more from those that make the cut.

In the retail sector, product suppliers are now sometimes expected to monitor and manage their own inventories. Ivars “Ike” Eichvalds, director of IS at Scotch Maid, Inc., a manufacturer of women's exercise clothing, says he expects that by mid-1994, Scotch Maid, not Wal-Mart, will be responsible for making sure there are adequate supplies of its apparel on store shelves.

TIGHTEN LINES

Speed and quality require close coordination between companies. Just as manufacturers are creating teams of employees with different skills and functional backgrounds, companies are also banding together to achieve common goals.

For example, Joseph Phelan, manager of supplier communications at Ford, says the automaker's suppliers participate in “the total production cycle, from design through manufacturing.”

Why is all this happening now? After all, there's nothing new about downturns in the business cycle or the cutthroat competition they spawn. What makes things different this time is the existence of information-delivery technologies that redefine possibilities.

The information needs of the 1990s have brought profound and sometimes painful changes to the IS profession. But considering how companies have come to rely on information technology to enable operational excellence, IS is mainly a victim of its own success. ●

PHOTOGRAPHY: JOYCE RAVID

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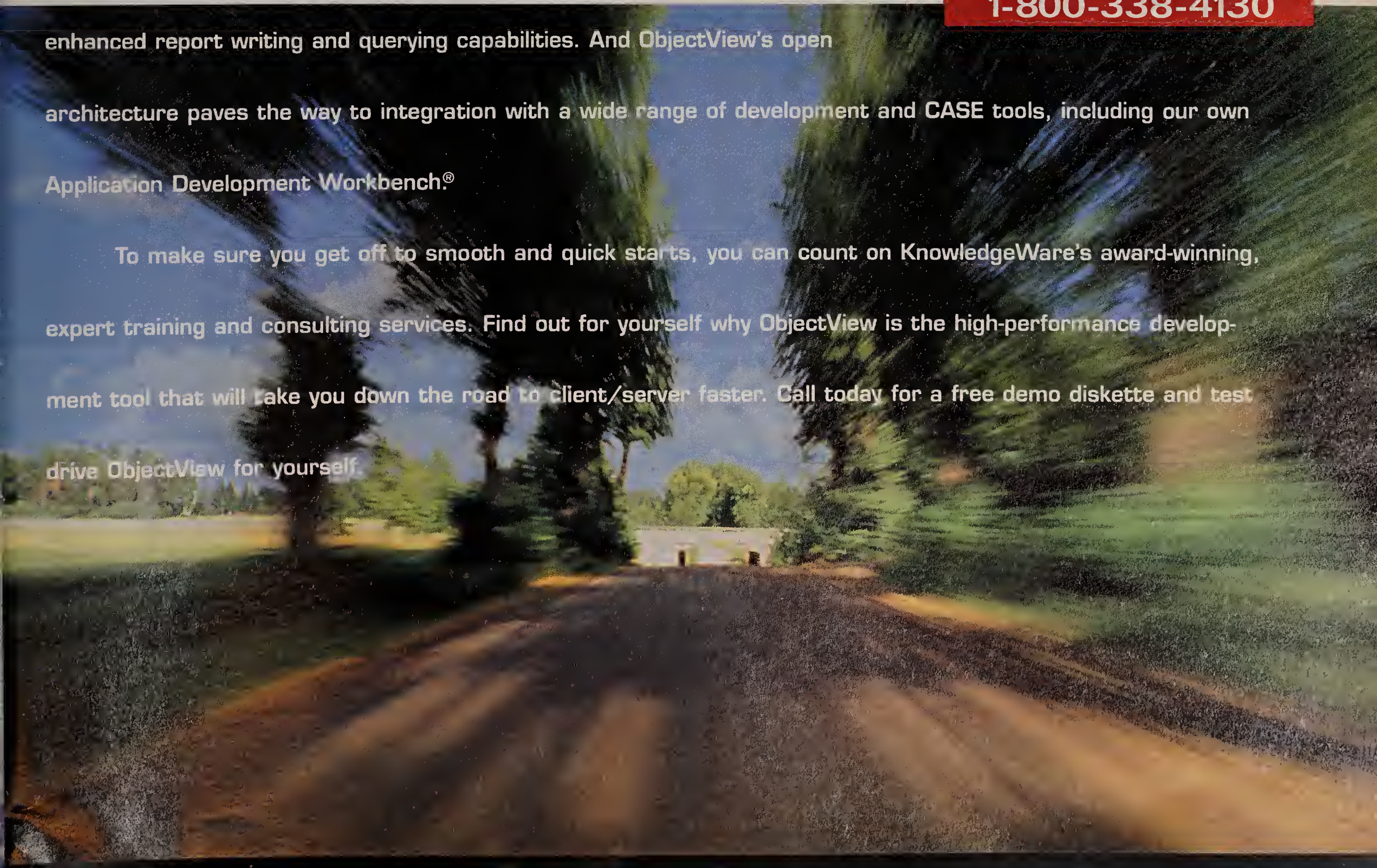

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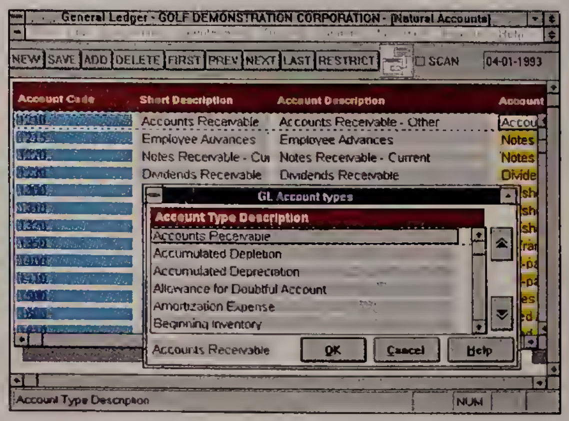
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Account Code	Short Description	Account Description	Account
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[illegible]	Employee Advances	Employee Advances	Notes
[illegible]	Notes Receivable - Cu	Notes Receivable - Current	Notes
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GL Account types

Account Type Description
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End users won't wait

Give 'em what they want — or they'll get it from somebody else

BY **THOMAS HOFFMAN**

HANGING ONTO USERS is easier if they're friends. M. Lewis Temares (left), CIO at the University of Miami, and Roosevelt Thomas, assistant vice president of human resources, know how to work out their differences amicably.

HE THOUGHT HE HAD IT ALL figured out.

In 1984, Chief Information Officer M. Lewis Temares and his information systems staff at the University of Miami embarked on a six-year, $15.2 million IS overhaul designed to provide university departments with integrated database management systems.

But not long after the project was completed in 1990 — $500,000 under budget — Temares learned from end users that the new systems didn't meet their information tracking requirements. "Some users were happy, but a lot of users weren't," Temares says.

The problems Temares and his crew faced aren't unique. End users' expectations are rising, and as a group, they are feeling both more confident and more willing to criticize IS performance.

Listen, for example, to Kathylynn O'Donnell Galbraith, an executive vice president responsible for global capital markets at The Chase Manhattan Bank NA in New York: "I'm not interested in how the feeds are made and what the equipment consists of," she says. "I just want the information to be there."

And then there's Doug Lawson, an assistant vice president of service management at CSX Corp. in Jacksonville, Fla. According to Lawson, who acts as a liaison between IS and end-user departments, "There's been some frustration here in the end-user community. The technology department has been mainframe-oriented, and its support of users hasn't been that active."

Being responsive to users' complaints isn't just a nice thing to do anymore. It's becoming a matter of survival. In many companies, particularly the larger ones, business departments are gaining greater control over their information technology spending, according to Joseph Ziskin, senior manager for the center for information technology and strategy at Ernst & Young in Boston. As this happens, many are deciding they'd rather throw their money to outside vendors.

Gartner Group, Inc., a Stamford, Conn., market research firm, recently found evidence of this trend in a survey of Fortune 500 IS executives. According to Gartner Group, in 1993, these companies allocated 35% of their IS budgets to decentralized systems to support their business units but expected that decentralized departmental spending would account for 55% of the total by 1998.

In defense of IS, end users' expectations aren't always realistic, and they aren't always seeing the whole picture. "If we can get people to see the solutions that are already out there, maybe they can use those tools without us having to reinvent the wheel," says Eugene H. Friedman, a vice president of corporate technology and information services at Chase.

SEEING FOR THEMSELVES

To help in this regard, Chase held a technology expo last March at its Brooklyn, N.Y., Metrotech data center. More than 6,000 users viewed and demonstrated 35 companywide applications, from image processing systems to customer services software modules.

Roosevelt Thomas, assistant vice president of human resources and an end user at the University of Miami, says users often get what they ask for but don't always know, at the outset, what it is that they really need. "Users may look at their needs from a very provincial point of view," he says.

In addition to a communication gap, there is also a resource gap that frequently prevents IS departments from giving user departments the kind of support that's now expected. "On the technology side, there's been a concern about the demand against their operating resources. [IS] has no way of knowing or predicting when they'll be hit with hundreds of inquiries at once," Lawson said.

To stretch available resources

CW SURVEY

41%

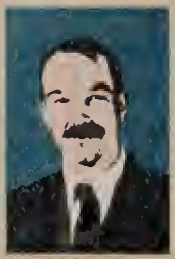
of IS executives say they've seen an increase in end-user influence over buying decisions.

PEOPLE TO WATCH

Paul Brenner, Baxter Healthcare Corp.

Vice President of Information Technology

Brenner's 1994 IS budget request is $8 million smaller than the one submitted for 1993. And he's smiling. Less layers make for leaner operation, and Brenner has collapsed the IS pyramid at Baxter so there are now only four levels between entry-level programmer and CEO. He has created functional groups organized by expertise and empowered to create self-directed, cross-functional work teams to address project needs. This setup gives IS staff more latitude but forces team effort. Performance ratings are based on individual work and team performance.



BRENNER

Larry Runge, Wheels, Inc.

CIO Larry Runge wants his 80 IS staffers to think like Viking explorers, who followed a leader only as long as he made sense. Not that Runge is planning on going anywhere; he's been at Wheels for only 11 months. But he's already shaking up structures. Two levels of directors and managers are now one layer of what he calls "patrons of the arts" — people who provide the tools, financial support and guidance that staffers need. Does it work? You be the judge: In seven months, Runge's group has produced a new vehicle remarketing system for one-tenth the cost of what a similar system cost a competitor.

RUNGE

Gary Osborne, Hughes Space & Communications Co.

Let's just say **Osborne** likes a challenge. While paring his 250-person IS staff to 100, this **CIO** is also undertaking a project to connect a Sybase DBMS used for decision support with Ingres and Oracle DBMSs that support resource management and product data applications. Each project manager has in-house and vendor staffers reporting to him so the in-house IS group stays in control of its domain but has vendor personnel ready to provide training and support. In a few instances, the company will turn over an entire project to the vendor, with Hughes' staff reporting to it.

OSBORNE

PHOTOGRAPHY: RED MORGAN

further, the IS units at CSX are exploring ways to make end users more self-sufficient. These include deputizing end users to train other end users on systems and providing graphical tools that give users easier access to data.

Union Pacific Railroad in Omaha is also giving graphical front-end tools a try. That company recently began outfitting users in its financial services departments with Powersoft Corp.'s PowerView and Microsoft Corp.'s Visual Basic software to ease data extraction.

"What we're trying to do is take the data off the mainframe, put it on a Unix platform and give users a dedicated data administrator to normalize and extract the data for them," says Mark Davis, Union Pacific's director of data management.

BUILDING SOLID RELATIONS

Still, IS departments will need more than graphical user interfaces and help desks to cement their relationships with end users down the road.

"As companies downsize to meet economic imperatives, IS must change its role to meet these changing information technology requirements," says Bill McNee, vice president and general manager at Gartner Group's Software Asset Management Service.

Many of the functions that IS departments once controlled are going by the wayside as end-user departments take control of their own information technology projects, McNee says. Though IS will continue to be responsible for systems and configuration management, these units will have to decentralize in order to forge closer bonds with end users. As this happens, McNee foresees the IS role evolving into that of a consultant or "gatekeeper" to help end users pick and choose suppliers.

PUTTING IT INTO PRACTICE

That's already happened at the University of Miami, Temares says. For example, the university's IS staff usually designs all the LANs to be implemented across the campus but relies on outside vendors for installation. So when an end-user department needs a new LAN, the university telecommunications team will review their needs and work up a bid for competing vendors, Temares says.

To solve its end-user data access dilemma, the University of Miami IS staff set up a data administrator in 1990 to determine the limitations of access between end users and departments. In addition, the IS department has been steadily implementing IBM OS/2 LANs across different departments to provide cross-business unit data access, with LAN projects scheduled there through the remainder of 1994.

Close-knit, long-term bonds with peers managing user departments can do a lot to ease tensions, too. Temares and Thomas, for example, have known each other for 13 years and have developed considerable respect and trust for each other.

"My staff has problems with people reporting to Lew from time to time, but we work it out," Thomas says. "It really pays to have that relationship solidified at our level."

New willingness to consider outsourcing

Commitment of users to in-house services shows softening

	PERCENTAGE OF USERS WILLING TO CONSIDER OUTSOURCING	
	1992	1993
Project management	13.8%	30.7%
Help desk	16%	32.8%
PC/Workstation configuration	17.3%	33.5%
Strategic planning	22.8%	42.5%
Software support/integration	29.8%	48.5%
Custom application development	31.5%	49.3%

SOURCE: DATAQUEST, INC. PROFESSIONAL SERVICE TRENDS USER WANTS AND NEEDS STUDY (JUNE 1993)

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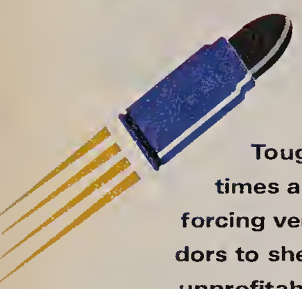
Crunch! An Industry Restructures

WHAT'S THE DIFFERENCE BETWEEN A competitor and a business partner? It depends on who's making the sale. Whether it's called 'coopetition,' 'strategic alliance' or 'all-out war,' the old barriers that separated friends from foes no longer apply. The once undisputed leaders are laying off tens of thousands of people and bleeding red ink. Leadership has passed into the hands of techie millionaires and venture capitalists. We take our best shot at helping you decide who's up, who's down and who's going underground.

IN THIS SECTION



Tough times are forcing vendors to shed unprofitable products, to the dismay of some customers.

PAGE 33

500 channels? That's just the beginning. There's gold in communications — computer convergence — if you live long enough.

PAGE 34

Ten small companies you'll be learning more about.

PAGE 35

NEW WORLD ORDER

The IBM of the '90s?

Microsoft and Intel are the new kingpins of computing. Are they fit to rule?

BY ED SCANNELL AND MICHAEL FITZGERALD

NOW THAT MICROSOFT CORP. and Intel Corp. have pried IBM's grip from the throttle of technological change, the big risk is that they'll make IBM's mistake of enjoying their success too completely.

Fueled by the phenomenal acceptance of PCs in corporations, the Microsoft/Intel axis dominates more than 85% of all desktops. Intel says it sold some 30 million chips just in the i486 market in 1993. Microsoft, meanwhile, cranks out more than a million copies a month of Windows alone.

With that kind of share and profitability levels that approach the absurd, some people are saying the two companies have replaced IBM as the computer industry's 2,000-pound gorilla.

Microsoft and Intel "are setting the agenda for the industry at the current time," says Sheldon Laube, national director of information and technology at Price Waterhouse.

Nonsense, the two vendors say.

"The role that IBM played is a role that nobody will ever play again in this business," says Dave House, Intel's senior vice president of corporate strategies. "Us sitting on a throne is a gross exaggeration. We're much more like leaders of Congress, [who derive] power from being able to set directions and then convince other free-minded people to go in that direction."

HEALTHY PARANOIA

Then again, according to House, Intel's motto is: "Only the paranoid survive."

Paranoia may be the right term for Intel and Microsoft, which seem pushed by a passion that is uncommon among the lavishly successful. The two are trying to leverage their installed base of compatible software and hardware to extend their dominance into the emerging world of client/server computing with Microsoft's Windows NT operating system and Intel's Pentium chip.

That will be a tough act to pull off. Whereas IBM dominated the '70s and '80s with proprietary hardware and software, Microsoft and Intel must establish standards that users increasingly ask be open, not de facto.

PERCEPTION VS. REALITY

Both companies talk about working and playing well with others. But many experienced information systems managers and competitors see only a couple of wolves in sheep's clothing.

"Microsoft is doing the same sorts of things IBM did 20 years ago. It is unilaterally setting standards through sheer volume and the force of its will," says Bob Holmes, manager of systems evaluation at Southern California Gas Co.

Bill Lodge, a project leader at The Turner Corp., a multinational construction company, says that for better or for worse, Turner is "married" to Intel's architecture for its client/server directions.

Microsoft has been paying at least lip service to openness of late. Over the course of 1994, Microsoft is expected to adapt its technologies to some open standards, including the X.500 messaging protocol, the Object Management Group's Common Object Request Broker Architecture standard and the Open Software Foundation's Distributed Computing Environment.

"It is a different world out there, and this new [computing] model has yet to be fleshed out. We will have to work with a variety of people to set architectural standards," says Steve Ballmer, Microsoft's executive vice president of worldwide sales and support.

But many observers remain skeptical that Microsoft is really opening up. For example, the company has made no public effort to work with the Common Open Soft-

ILLUSTRATIONS: PHILLIP BURKE

> “WHAT WE ARE WITNESSING IS THE TURMOIL CAUSED BY A PHENOMENALLY CREATIVE INDUSTRY CONTINUING TO BE RIPPED APART BY THE GREEDY AND SELFISH USERS. DAMN THEIR EYES.”
>
> ROBERT YOUNG
> EDITOR
> NEW YORK UNIX MAGAZINE

ware Environment's (COSE) efforts to create an open standard for interfaces. Nor has it been as cooperative as it could be in opening up its Messaging Application Programming Interface technology, some say.

STANDARDS DANCE

Intel, meanwhile, has joined standards groups such as the Video Electronics Standards Association and Personal Computer Memory Card International Association, only to later develop its own, competing standards.

In the client/server markets, Intel will have to compete against deep-pocketed companies such as the IBM/Apple Computer, Inc./Motorola, Inc. venture, Hewlett-Packard Co. and Digital Equipment Corp., all of which have their own chip architectures.

Intel has started a fledgling client/server computing unit and has its chips in everything from palmtops to massively parallel monsters but has little direct experience with information systems issues.

Users, though, say that as long as important business software runs on Intel's chips, the company does not need a presence in IS.

“Most companies are not going to want to sway from what's the mainstream,” says Glenn Sandusky, chief information officer at Aon Specialty Group, a consulting company in Chicago. “The best technology is not always the [best] decision.”

COMPETITION FOR INTEL

However, some analysts say they see a chance for Intel to slip.

“Intel for the first time will be seriously challenged by the PowerPC, which can take a bite out of Intel's desktop share. The only question is, how big will that bite be?” says Will Zachmann, president of Canopus Research, Inc., a consultancy in Hingham, Mass.

While everyone focuses on Microsoft and Intel, a dark horse is emerging. Some people believe IBM still has a chance to be the “IBM of the '90s.”

In its attempt to reinvent itself, the company appears to be making a more aggressive attempt to set open standards than Microsoft.

It is an active participant in the OpenDoc and COSE consortia and continues to support joint hardware and software ventures with Apple and Motorola.

“What IBM is doing is leapfrogging Microsoft to set the standards for the next generation of products. I think that is what Taligent [the IBM/Apple object-oriented operating systems project] is all about,” says John Dunkle, vice president at WorkGroup Technologies, Inc., a market research firm in Hampton, N.H.

IBM lost its standards-setter status when it failed to check its ego at the open systems door. Observers say that to succeed, Microsoft and Intel must make sure they don't make the same mistake. •

HYPE WARS

NEW! GREAT! LATE!

Not having a product shouldn't stop you from issuing the press release

BY JAMES DALY AND KIM S. NASH

What do Windows NT, the information superhighway, Oracle Corp.'s Oracle 7 and the separation of Chuck and Di have in common? They were all talked about long before they actually happened.

But whereas Britain's royal split made for little more than a tabloid diversion, information systems managers sometimes put their jobs on the line based on over-hyped projections, promises and strategy statements about next-generation technology.

“Unfortunately, [vendor] hype is a way of life,” says Brian Comnes, manager of the information center at DHL Airways, Inc. in Redwood City, Calif.

For example, Oracle Chief Executive Officer Larry Ellison began expounding on the planned features of Oracle 7.0 more than 2½ years before it shipped earlier this year. Many Oracle customers say they expect that kind of behavior from Oracle and factor it into their plans.

Companies known for lofty talk say they are helping users plan ahead. Critics counter that those firms try to lock out competition by preannouncing technology that is nowhere near delivery.

“That's the line you walk [when] talking about the future,” says Peter Kastner, an analyst at Aberdeen Group in Boston.

But sometimes hype can backfire. For example, Apple Computer, Inc. spent so much energy hyping the Newton personal digital assistant that many folks thought the company took its eye off the ball.

“Right now, Apple is going in way too many directions at once,” says Eric Joa, manager of IS at BC Hydro in Burnaby, British Columbia.

With that experience in hand, Apple has better coordinated the arrival of the PowerPC-based Macintoshes by issuing clear statements about which machines would be upgradable to the new line and when.

Users say they are wary of vision statements. “Whenever I see a ‘panacea’ pushed by vendors, it scares me,” says Chuck O'Leary, a consultant at Modisette Associates, a Houston software implementor.

For hype-weary users, there's little relief in sight. The reason: Very often, hype works.

Consider object-oriented databases. Oracle, Sybase, Inc., Informix Software, Inc. and others have begun talking up object plans at the expense of competitors. “Users see no reason to buy from a tiny, unknown object company if they can wait, safe and warm, for Oracle to get [them] to where they want to go,” Kastner says.

DAVID COURSEY'S “PC LETTER”

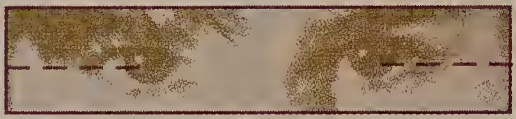
VAPORWARE HALL OF FAME

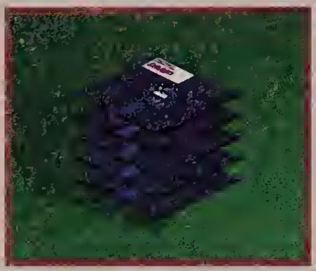
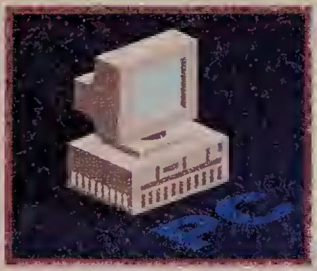
- **THE FAVORITES: Microsoft's Windows** was announced in November 1983 but didn't ship until November 1985. **Windows NT** spent 28 months on the list before shipping last July.
- **Lotus' 1-2-3 Version 3.0** spent a year on the list following its June 1988 announcement.
- **THE CURRENT LEADER: Kaleida's ScriptX** at 18 months.
- **LONGEST EVER (WE THINK):** An optical drive from **Verbatim**, which was listed for more than three years during the late 1980s.
- **DIRTY SECRET:** Some companies actually like to be on the list, figuring it's **good publicity**.

Source: “PC Letter”

LEADERS and LAGGARDS

An irreverent look at who does what, where and why, who's bold, who's cold and who's likely to get rolled



	TRENDSETTERS	CONTENDERS	ALSO RANS
PC software 	**Microsoft Corp.:** Trendsetter seems too weak a word for a company that can tilt the water it walks on. The new icon of U.S. business is its own best critic and never concedes a market. May even nail networking with an OEM strategy for Windows for Workgroups and NT. **PeopleSoft, Inc.:** Aggressive marketeer actually makes client/server financial applications that user companies want.	**WordPerfect Corp.:** E-mail applications are solid. Word processing lacks former luster, though, as its Windows product gets a mixed reaction. Its suite spot with Borland International, Inc. could develop broken strings. **Next Computer, Inc.:** OK, so Steve Jobs shouldn't have tried to build the next Macintosh. But NextStep for Intel excels as an operating system. It could be a dark horse.	**IBM Personal Software Products:** In the PC software race, IBM has typically run like a dead horse, but repeated beatings may bring it back to life. Recent progress on OS/2 and its forthcoming Workplace OS and Taligent operating environments could move it up to contender status. **Borland:** Struggling to get products out and make its objects desirable to IS. The $49.95 Quattro Pro price promotion is a bold gambit, but it's seen more as desperation than an innovation.
PC hardware 	**Compaq Computer Corp.:** Compaq got its ego handed to it in 1992 but now walks its talk, as huge growth rates put it in sight of IBM's No. 1 market position. Groundbreaking server effort in Proliant and macho product development partnerships should keep it moving. **IBM PC Co.:** If you can't build it, will they keep coming? IBM breaks both records and IS project schedules with great products it can't ship. Best technology of any hardware maker.	**AST Research, Inc.:** Orange County's PC maker seems too influenced by the land of Disney. Maybe Tandy Corp.'s Texas blood will help AST leverage pioneering efforts in branding strategy and diversification. **Apple Computer, Inc.:** Proud-and-paying-for-it unclone maker appears ready to find its way out of the proprietary wilderness, but can it stand being out in the open? It garners fanatical support from its installed base, but PowerPC and the coming open software gambit may be too little, too late.	**Dell Computer Corp.:** Desktop volumes are nice, but the young gunslingers in Austin, Texas, shot off one foot with a failed notebook strategy and the other with distribution problems caused by pell-mell growth. Still, if the market is strong in '94, Dell might be able to reload. **About 500 clone makers:** Life under a microscope is proving uncomfortable for everyone you've never heard of. They will fight for their lives under pressure from the Big Two.
Networking 	**Novell, Inc.:** Hey, Ray or no Ray, it's Novell, and it's also moving to improve enterprise services with AppWare in a client/server application development situation. **IBM/Hewlett-Packard Co.:** These two understand enterprise networking management better than anybody else, and that old-line vendor guise may mask wisdom that can help large firms move to enterprisewide client/server.	**Banyan Systems, Inc.:** Though it was first to work toward extending directory and other services beyond its own environments, users tend to lose this tree in the forest. **Cisco Systems, Inc.:** Aggressive, but its router architecture lacks the oomph needed to go to next-generation networking. **SynOptics Communications, Inc.:** The smart hub/ATM switch company has grabbed its market share lead back from Cabletron Systems, Inc.	**Microsoft:** Redmond's armor has two chinks: Chairman Bill Gates' suits and networking. Neither is hopeless. LAN Manager may get hotter, thanks to Microsoft's determination to get everything right. Advanced Server needs to be more than LAN Manager for NT; stay tuned in 1994. **Sun:** Sun's management is less than proactive here. Maybe that's why Sun is the only major SNMP player on the sidelines of the IBM/Digital/HP alliance.
Multiuser hardware 	**IBM:** Go ahead, sneer, but when IBM sneezes, it spreads a lot of germs. **HP:** Five years ago, HP was in the Top 5 most profitable computer companies. Today, it's the only one still on the list. HP put its chips behind Unix early on and still reaps the benefits, despite order fulfillment problems. **Unisys Corp.:** The Blue Bell big iron maker, flush with sustained profitability, leads big mainframe makers in move to cheaper CMOS-based technology and MPP.	**Digital Equipment Corp.:** So far, Robert Palmer's haircut is the best thing about life after Ken Olsen. The company gets points for trying: Witness Alpha AXP's price/performance and its early embrace of Windows NT. But Digital is a 98-pound weakling in commercial Unix, and Alpha is struggling. **Data General Corp.:** More like a Data Sergeant but has built its Aviion systems line into something of interest to key Unix software vendors. Multiprocessing support an advantage.	**Amdahl Corp.:** Finding itself swamped by low tide, as mainframe demand wanes. **Wang Laboratories, Inc.:** Exiting hardware market but trying to keep its installed base for as long as possible. Wang needs to milk service revenue to subsidize rebirth as a vendor of imaging and work-flow software. Effort could be stillborn, even if installed base stays loyal.
Client/server 	**Oracle Corp.:** Take equal parts clout and marketing, mix with solid installed base, and who cares if the technology is not the sexiest? **Intel Corp:** So far, competition hasn't punctured profits as Intel reshapes itself to stay ahead in the race. Well-positioned to sell multiple chips per system. **HP:** Established best strategy of the big companies for bringing people down from old systems. Aggressively marketing Unix in place of mainframes.	**Sun Microsystems, Inc.:** Always a force to be reckoned with, it needs to figure out how to harness its installed base and application software and ride those instead of its hardware line. **NCR Corp.:** Negative cash returns make it a profit albatross for corporate parent AT&T, but commercial Unix is a bright spot. It's the first old-line vendor to convert completely to Intel architecture.	**Digital:** The Baskin Robbins Unix strategy has so far failed to impress. **The Dodge Group:** It sounded good two years ago, but repeated promises of client/server financial apps to come "soon" sound like a broken record now.

DESIGN: JOSE E. BRUZUAL
ILLUSTRATIONS: DAVE MARSHALL

Intensive care

For the industry's troubled giants, survival tops the 1994 to-do list

BY **CRAIG STEDMAN**

FLAT OR DECLINING REVENUE and evaporating profit margins have delivered a stunning one-two punch to many major vendors. Can they fight their way back? Here's the score to date:

IBM

After losing $4.97 billion in 1992 and $8 billion plus in the first nine months of 1993, IBM is given a shot at breaking even or reporting a small fourth-quarter profit. But David Wu at S. G. Warburg & Co. in New York, notes that IBM is heading back to profitability through cost-cutting, even though revenue fell compared with 1992.

"Now they have to raise revenue, and we haven't seen any sign of that yet," Wu says, although he adds that one bright spot is the recovery of the IBM PC Co. That unit turned in a 50% sales increase in the third quarter after getting more aggressive on product cycles and pricing.

However, mainframes still hold the key for IBM, providing about one-third of its business. "As mainframe revenues and profits go, so does IBM," says Bob Djurdjevic, president of Annex Research in Phoenix.

DIGITAL EQUIPMENT CORP.

Digital's make-or-break Alpha AXP technology faces some major obstacles in steering the company back to growth.

"Their biggest problem is the perception that they're not a real Unix vendor," says Chris Christiansen, an analyst at International Data Corp. (IDC) in Framingham, Mass.

Despite some signs of Alpha growth, Digital still loses orders that should be "open-and-shut wins" due to shortcomings in sales and marketing, notes Wes Melling, an analyst at Gartner Group, Inc. Digital admits its sales force has been reluctant to embrace Unix, a problem it's working on.

UNISYS CORP.

While Unisys has had eight straight profitable quarters, its revenue dropped to $5.6 billion in the first three quarters of 1993, off by nearly a half-billion dollars from a year earlier. The company has done "a marvelous job" of cost-cutting, "but if the revenue continues to shrink, the profitable footing will go away," says Barry Bosak, an analyst at Smith Barney Shearson, Inc. in New York.

Despite increased U.S. commercial business, Bosak says he sees "no reason" to expect renewed revenue growth in the near term.

APPLE COMPUTER, INC.

Apple has just barely avoided red ink, although its revenue is still climbing. The company is trying to make its cost structure more realistic but is counting mainly on PowerPC-based hardware, due out in early 1994, to turn things around.

The transition "is a make-or-break issue for them," says Pieter Hartsook, publisher of "The Hartsook Letter," an Apple-specific newsletter in Alameda, Calif.

Eric Lewis, an IDC analyst, says he expects PowerPC models to account for 12% of Macintosh shipments in 1994 and about half of Apple's volume by 1995. ●

Hardware and software leaders

HARDWARE

Hardware listings are ranked by the vendor's total hardware sales including mainframes, midrange, PCs, workstations and peripherals

TODAY	1988
1. IBM	1. IBM
2. Fujitsu	2. NEC
3. NEC	3. Fujitsu
4. Hitachi	4. Digital
5. Hewlett-Packard	5. Hitachi
6. Apple	6. Hewlett-Packard
7. Digital	7. Apple
8. Siemens Nixdorf	8. Unisys
9. Compaq	9. Group Bull
10. AT&T	10. Siemens

SOFTWARE

Software listings are ranked by the vendor's total software sales

TODAY	1988
1. IBM	1. IBM
2. Microsoft	2. Fujitsu
3. Fujitsu	3. Digital
4. Digital	4. CA
5. NEC	5. Unisys
6. Hitachi	6. NEC
7. CA	7. Siemens
8. Siemens Nixdorf	8. Hitachi
9. Novell	9. Microsoft
10. Lotus	10. Nihon Unisys

Sources: Gartner Yardstick, Stamford, Conn.; International Data Corp., Framingham, Mass.; vendor reports

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VENDORS GET FOCUSED

Back to basics

Cash-strapped vendors are focusing on doing what they do best

BY **CRAIG STEDMAN**

BRIDGEPORT HYDRAULIC CO., A PRIVATE-SECTOR water utility in Bridgeport, Conn., had a demonstration of Digital Equipment Corp.'s DECmcc network management software one Friday last August. The next Monday, word came down that Digital was ditching DECmcc in favor of IBM's NetView/6000.

Although Digital has said it will provide a migration path from DECmcc, Dave Yakerson, Bridgeport Hydraulic's network administrator, says he is glad to have dodged a bullet. "I'd hate to be one of the people that bought into that and got stuck," he says. "But that's just the nature of the beast."

These days, anyway. With profit margins across the computer industry heading south, vendors are increasingly shedding product lines that don't have a lot of strategic value.

"We're going into an era of unbelievable vendor churn," says Wes Melling, an analyst at Gartner Group, Inc. in Stamford, Conn. "There's going to be a lot of orphan hardware out there and maybe even orphan database managers."

Some customers are worrying more about getting stuck with the unwanted offspring. "It makes you nervous when [vendors] start narrowing the focus because, as a user, I'm not narrowing things," says Tim Bird, director of information services at Paws, Inc. in Muncie, Ind.

Bird tries to lower the risk of getting caught on the hardware side by leasing his equipment. "We might get burned, but we won't get burned for more than three years," he says. Other users are looking for portable software as a hedge against obsolescence.

"It's probably scarier now because of all the volatility in the industry," adds Raymond Sasso, chief information officer at J. R. Simplot Co., a food processor in Boise, Idaho. "Recent events show there are no safe harbors."

J. R. Simplot is finishing implementation of a distributed warehouse inventory system based on Digital's DECsystem hardware and Ultrix operating system, both of which are being de-emphasized.

The system works fine, but the platform "doesn't have a future as far as I can tell," Sasso says. "We see it as a fairly common experience in the future." ●

OVER AND OUT

THESE PRODUCTS HAVE BEEN DROPPED OR ARE BEING PHASED OUT BY VENDORS AS THEY FOCUS ON MORE STRATEGIC PURSUITS

IBM
OfficeVision LAN

Digital Equipment Corp.
DECmcc network manager
DECsystem/DECstation hardware lines

Sun Microsystems, Inc.
OpenLook user interface

Lotus Development Corp.
Agenda personal organizer
Symphony integrated software

Next Computer, Inc.
Next workstation hardware

Unisys Corp.
V series mainframes

Control Data Systems, Inc.
Cyber mainframes

3Com Corp.
3+Share LAN software

Borland International, Inc.
Multimate word processor
Brief programming tools

Wang Laboratories, Inc.
Personal computers

Alliant Computer Systems Corp.
FX series minisupercomputers

BOOM!

That's the sound of firms falling over themselves to get in on the convergence of computing and communications

BY JAMES DALY AND MICHAEL FITZGERALD

FIFTY-SEVEN CHANNELS AND NOTHING ON? Try double that. Try thinking about television replacing the telephone. Or the possibility of a vast sensory garden of educational and entertainment options.

Take your pick. But brace yourself. The forthcoming "digital convergence" — the blending of the computer, publishing, entertainment, cable TV and consumer electronics industries in one TV-top device — promises to generate dozens, perhaps hundreds, of mergers and alliances. For the next two years, the tantalizing promise of merging high technology with a lowest common denominator market means a frenzy of partnerships, mergers and buyouts, many of which will be less than harmonious.

Oh, and by the way, here's the hype: Jonathan Crane, president of national accounts at MCI Communications Corp., calls the computer and telecommunications industries "the twin engines that are helping to re-engineer the way the world works today."

The realm of information systems may reap its biggest spending boom — and garner its biggest headaches — in recent times. Companies agog at the chance to market directly into customers' homes will need new systems designed — systems capable of gauging new markets, selecting the best targets, getting to them and taking in huge amounts of information on the backswing and processing it in real time.

EMERGENCY

In a year of mega mergers, four stood out as leading indicators of industry consolidation

ACQUISITOR	ACQUIRED	PRICE
AT&T*	McCaw Cellular	$12 billion**
This megadeal could make wireless services a reality sooner than expected, providing the Securities and Exchange Commission decides the partnership does not violate antitrust and tariff regulations.		
Bell Atlantic	Tele-Communications, Inc.	More than $12 billion**
The biggest merger in U.S. history could further this partnership, announced in October, and other huge communications deals have forced the FCC's hand in regulating once-distinct industries.		
Cisco	Crescendo	$90 million
About 50 major hub and router makers will regroup into roughly 10 large players during the next few years, according to Broadview Associates.		
Sterling Software, Inc.	Systems Center	$156 million
The deal consolidates mainframe systems management tools under the Sterling roof.		

*Pending **Estimated

SOMETHING NEEDS TO CHANGE

"It's absolutely an IS challenge," says Douglas Murphy, director of IS at Comcast Corp., a major cable provider that has its teeth in several of the new digital pies.

Murphy says digital convergence definitely means a different mind-set for IS. "I'm used to supporting the [administrative side], and now you're talking about IS out there at the field level. Our billing vendors are scrambling to come up to speed on how to track every single transaction and event."

Combining "the power of the PC with the simplicity of the TV," as General Instrument Corp. Chief Executive Officer Donald Rumsfeld puts it, means changes for IS outside "cable land" as well. It grabs the minds of retailers and bankers, among others.

Allen Cournyer, senior vice president and manager of the data division at Texas Commerce Bank, says bringing banking services into homes via TV is "a tremendous opportunity for us."

"It's a very interesting series of mergers; the mind goes wild with all the options," Cournyer says.

He points to the opportunity to let people call up bank statements on their TVs as something that could reduce back-office costs for the bank and enhance customer service.

Justin Alexander, manager of advanced technology at SmithKline Beecham, Inc. in Philadelphia, says he sees plenty of potential for internal improvements as well. "We think of it as . . . being able to use telecom and computers to pull the company closer together. That's an extremely powerful thing."

NOT EVERYONE'S EXCITED

Still, some IS managers, even at telecommunications companies, are skeptical of the ventures. For instance, John Miller, director of office systems technology at GTE Corp.'s GTE Telephone Operations, says that even though his company is already equipped with an internal Integrated Services Digital Network backbone and makes some in-house use of desktop-to-desktop videoconferencing, all this hoopla about convergence has very little to do with his current plans.

"I just don't see it in the short term affecting my plans internally at all," Miller says, dismissing the visions of do-everything, be-everything technology as simply not close enough to reality.

Technology, though, is not the main issue. The big stumbling block for IS, as well as for everyone else, will be cost, starting with cost to the customer everyone is hoping to reach. Right now, it appears to be a much bigger number than consumers will be willing to absorb.

"There is a very receptive audience for interactive products in the home, but execution and pricing will be key for product success," says Bruce Ryon, principal analyst at Dataquest, Inc.'s multimedia service.

Consumer research suggests that when given the ability to choose from a broad range of programming, the majority of viewers will not watch TV advertising. Without advertising revenue, however, the cost of interactive TV could be prohibitive.

Another cost factor is that poor quality wiring in the home may need to be replaced, especially to handle video-on-demand. The Yankee Group estimates that the per-house cost could run as high as $2,000.

Cournyer calls cost the big question. "Think of what they have to pay to lay the cable to get this ready; somebody's going to have to eat that cost. This thing is sort of like a billboard, and it comes down to who owns it and what does it cost [for us] to put things there?" he says. ●

ILLUSTRATION: ANDREW FAULKNER

The fast-track favorites

The Microsoft of tomorrow may be in a garage today. Or it may be a fat investor's darling with $35 million of venture capital. It's impossible to guess who will be the next big winners in this rollicking industry, but here is our list of a few little-known companies that we believe have a shot at making big names for themselves.

Action Technologies, Inc.

NICHE:
Work-flow software

PRESIDENT:
Thomas E. White

Backed by its solid record as an innovator in the area of electronic mail (the company developed MHS, or Message Handling Service, a messaging infrastructure now in use in Novell, Inc. NetWare LANs), Action has turned its attention to work flow, which some say will be the next killer application.

WHITE

The Alameda, Calif., company, which is venture capital-backed, has built its system around two approaches that fit into the way many PC users work. One uses Lotus Notes as a framework but supplies front-end, work-flow design and routing mechanisms. The other piggybacks on the existing SQL relational database at the customer site.

Customers include Bankers Trust, Electronic Data Systems Corp. and General Motors Europe.

Excalibur Technologies Corp.

NICHE:
Image scanning and recognition

PRESIDENT AND CEO:
Mike Kennedy

San Diego-based Excalibur's PixTex Electronic Filing System has a free-form — as opposed to a keyword- or topic-based — approach to indexing and searching for imaged documents. The system uses an adaptive pattern recognition system that recognizes images based on data in the image. With ASCII text, for instance, the system indexes every letter of every word on every page. It then searches based on discrete patterns in the text. Say you're searching for Kadhafi. Whether you enter Qaddafi or Kadhafi, the algorithm will find enough patterns for the system to return all spellings each time data is added to the repository.

KENNEDY

The pattern recognition part of the system is also sold separately as a tool kit for companies to create their own applications. It's popular for security applications in which employee images are matched to previously archived photos.

Companies such as IBM, Digital Equipment Corp., Hewlett-Packard Co. and Sun Microsystems, Inc. refer customers to Excalibur when they need a system like this.

Seer Technologies, Inc.

NICHE:
Computer-aided software engineering (CASE)

CEO:
Gene Bedell

This 3-year-old spin-off of First Boston Co. has been a juggernaut, ramping up to more than $34 million in revenue with its object-oriented CASE tool set.

BEDELL

According to Gartner Group, Inc. in Stamford, Conn., Seer's strengths in the integrated CASE client/server development tools market include support for a large number of client/server platforms, an event-driven graphical user interface and a version-rich repository.

The Cary, N.C., company has already fashioned a niche with financial services firms such as Charles Schwab & Co. and PaineWebber, Inc.

UniSQL, Inc.

NICHE:
Database queries

PRESIDENT AND CEO:
Won Kim

Won Kim's firm appears to have one of the few systems available that can store and retrieve object data types as objects, using the SQL data access language.

KIM

Kim's Austin, Texas-based company has apparently succeeded where others have merely tried. Oracle Corp. has yet to announce a similar capability. HP has backed away from this type of functionality, even though it is heavily invested in an object-oriented future.

Some of UniSQL's customers include Hughes Aircraft, AT&T, the U.S. Air Force and Goldman, Sachs & Co.

VLSI Technologies, Inc.

NICHE:
Microprocessors

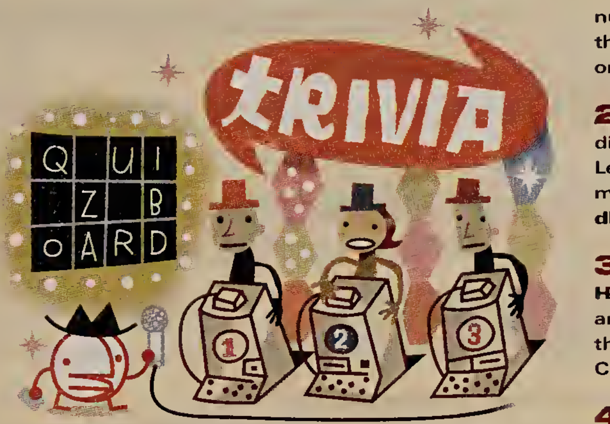
CEO:
Alfred J. Stein

A partnership with Microsoft Corp., Compaq Computer Corp. and Intel Corp. to build integrated 386 processors for handheld devices has Santa Clara, Calif.-based VLSI in the catbird's seat. VLSI specializes in space-efficient "glue-logic" chips, which build in many other processors needed to drive PCs. In fact, VLSI developed the chip set used in Apple Computer, Inc.'s Newton.

STEIN

Intel previously licensed its x86 architecture to VLSI, in which it currently has a 16% stake. When the deal was inked to develop personal digital assistant (PDA) chips, the two brought in Microsoft to support the Polar chip set, as it's called, with At Work. That way users can access their At Work desktop-based documents via a PDA

UPSTARTS, *page 36*



BRAIN TEASERS

1. A high-tech executive recently wrote a book that has nothing to do with computers. It's about diet and nutrition and is titled **The Ten Percent Solution**. Is the author **Mitch Kapor, Ray Kurzweil, Philippe Kahn** or **John Akers**?

2. What software program holds the dubious distinction of being on the vaporware list of "PC Letter" for the longest time — four years and two months? Was it **1-2-3 for the Macintosh, Windows, dBase IV** or **OS/2**?

3. According to the investment monthly **"The Red Herring,"** a newly minted CEO laid off an executive VP and board member with the words "Al, we have to cut the fat around here, and **you're the fat.**" Who was the CEO?

4. How many **Microsoft** employees own at least a **million dollars'** worth of company stock?

5. **Scott Page**, one of the co-founders of **7th Level, Inc.**, which sells interactive multimedia entertainment software, played tenor sax for which rock group: **Cheap Trick, Pink Floyd** or **Yes**?

6. What NBA team does **Interval Research's Paul Allen** own?

7. What is the **annual cost** of generating the power to run all the PCs in the world: $1.2 billion, $4.6 billion or $7.1 billion?

8. Name the high-tech company that raised **the most venture capital** in the first three quarters of 1993.

1. Ray Kurzweil
2. 1-2-3 for the Macintosh
3. Michael Spindler, CEO at Apple, laying off Albert Eisenstat
4. 2,000
5. Pink Floyd
6. The Portland Trail Blazers
7. $4.6 billion
8. OpenVision Technologies in Pleasanton, Calif., raised $35 million from one company, Warburg Pincus Ventures

Sources: The Computer Museum, Boston; 7th Level, Inc.; *The Green PC* (Windcrest/McGraw-Hill); "The Red Herring" (Flipside Communications, Inc.), Redwood City, Calif.

FAVORITES

Continued from page 35

containing the Polar chip set.

Meanwhile, Compaq has chosen the Polar chip set for its PDAs, expected in 1994. Other PDA manufacturers are also expected to use the Polar chip set.

With the handheld market projected to boom in the next few years, VLSI could be in the right place at the right time.

Platinum Software Corp.

NICHE:
Financial software

CEO:
Gerald R. Blackie

BLACKIE

The client/server financial market is so competitive that it is unclear who will emerge as the market leader. Platinum may come out on top because of its mature reseller channels and strategy of finding good software and then acquiring the maker.

In November, for example, Platinum acquired Lotzof Associates and its client/server cost management system.

"When Platinum sees a better technology, they buy it," explains Ted Mountzuris, director of application development at General Cinema, Inc. in Chestnut Hill, Mass.

So far, the company has announced major strategic business partnerships with Sun, Digital and HP and reported an annual earnings growth of 147% for fiscal year 1993. Its 1993 revenue was $39 million.

SystemSoft Corp.

NICHE:
Mobile computing

PRESIDENT AND CEO:
Robert Angelo

ANGELO

This Natick, Mass., venture capital-backed firm has a serious leg up in the PCMCIA market. It has already made a name for itself with its Cardsoft product, which enables PCMCIA cards to be compatible with any notebook. More recently, it signed a deal with Microsoft to allow Chicago to offer built-in PCMCIA compatibility.

With 50% to 60% growth each year since 1989 and $10 million projected revenue for the end of the fiscal year (January 1994), SystemSoft shows promise.

Netlabs, Inc.

NICHE:
Network management

CEO:
Andre Schwager

This company is reputed to have the only truly distributed network management product on the market today. McDonald's Corp. and other large companies are considering Dimons, or Distributed Management of Networks and Systems, for their sites. The Los Altos, Calif., company is rumored to be supplying its technology to Sun for its upcoming distributed SunNet Manager. Netlabs is also supplying technology to AT&T/NCR as the basis for its enterprise network management platform.

Syzygy Communications, Inc.

NICHE:
Internetworking

CTO:
Steven J. Jackowski

JACKOWSKI

Although very small, this Scotts Valley, Calif., company will have a big impact on people with large bandwidth needs.

Syzygy is working on ways for router companies to reserve bandwidth so video and other real-time services can be delivered over an internetwork backbone.

Without the guaranteed bandwidth, you can deliver video only over leased lines.

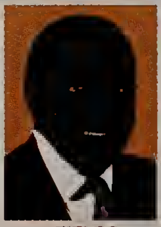
Syzygy is also said to be negotiating with some very key industry players.

OpenVision Technologies

NICHE:
Systems management software

CHAIRMAN AND CEO:
Mike Fields

This venture capital company's investors think there is money to be made in creating a suite of Unix utilities. They may be right. Computer Associates International, Inc. is trying to do the same thing.


FIELDS

Founded by Mike Fields, former head of Oracle USA, Pleasanton, Calif.-based OpenVision is going the acquisition route.

OpenVision Technologies has purchased 11 companies, including a former Digital market utilities company, to pull together a set of utilities and convert them to Unix.

In the commercial arena, Unix needs a full suite of system utilities to make it a production-level system. ●

CALENDAR 1994

So many trade shows, so little time to spare.

Trade Shows

JANUARY 5-8:
MacWorld
San Francisco, (617) 361-2001

JANUARY 24-27:
ComNet
Washington, (508) 879-6700

FEBRUARY 15-17:
Networks Expo
Boston, (201) 346-1400

MARCH 21-25:
UniForum
San Francisco, (800) 225-4698

APRIL 19-21:
Networks Expo
San Francisco, (201) 346-1400

MAY 2-6:
Interop/Networld
Las Vegas, (415) 941-3399

MAY 10-12:
MacWorld
Washington, (617) 361-2001

MAY 23-26:
Windows World/ Comdex/Spring '94
Atlanta, (617) 449-6600

MAY 24-27:
DB Expo
San Francisco, (800) 2DB-EXPO

JUNE 28-30:
PC Expo
New York, (201) 346-1400

JULY 27-29:
Object World
San Francisco, (508) 879-6700

AUGUST 2-5:
MacWorld
Boston, (617) 361-2001

SEPTEMBER 12-14:
Interop/Networld
Atlanta, (415) 941-3399

SEPTEMBER 20-22:
Networks Expo
Dallas, (201) 346-1400

OCTOBER 4-6:
Unix Expo
New York, (201) 346-1400

OCTOBER 19-21:
PC Expo
Chicago, (201) 346-1400

NOVEMBER 14-18:
Comdex/Fall '94
Las Vegas, (617) 449-6600

Theme Conferences

JANUARY 18-21:
Client/Server Conference & Exposition
San Jose, Calif., (516) 562-7460

FEBRUARY 7-9:
Meta Group's Metamorphosis 1994
Coronado, Calif., (203) 226-6382

FEBRUARY 14-16:
Gartner Group's Migration Strategies Conference
Orlando, Fla., (203) 967-6757

FEBRUARY 14-17:
Mobile World
Dallas, (301) 309-9404

FEBRUARY 28-MARCH 3:
Groupware '94
Boston, (602) 661-1260

MARCH 7-10:
Mobile '94
Sponsored by Technologic Partners, San Jose, Calif., (212) 696-9330

MARCH 9-11:
Gartner Group's Personal Computing Conference
New Orleans, (203) 967-6757

MARCH 9-11:
Software World
Toronto, (508) 470-3880

MARCH 13-17:
Help Desk Institute's 1994 International Conference
Nashville, (719) 531-5138

MARCH 15-17:
International Software Business Development Conference
(Formerly Software Development Conference), San Jose, Calif., (203) 847-5131

MARCH 20-23:
The PC Forum, "Interactivity is Two-Way"
Sponsored by Edventure Holdings, Phoenix, (212) 924-8800

MARCH 20-24:
Multimedia World
Las Vegas, (410) 626-1380

MARCH 21-22:
Gartner Group's Business & Asset Management Conference
Tucson, Ariz., (203) 967-6757

MARCH 23-25:
Meta Group's Global Networking Strategies
Orlando, Fla., (203) 226-6382

APRIL 5-8:
15th Annual Conference

CALENDAR, *page 38*

Continued from page 37

on IS Performance and Capacity Management
Phoenix, (602) 997-7374

APRIL 14-15:
Gartner Group's Industry Futures Conference
Boston, (203) 967-6757

MAY 4-5:
Gartner Group's Economics of Networking Conference
Orlando, Fla., (203) 967-6757

MAY 9-11:
Meta Group's Services and Systems Management Strategies
Reston, Va., (203) 226-6382

MAY 23-25:
Gartner Group's Application Development Conference
San Diego,
(203) 967-6757

JUNE 13-15:
Meta Group's Enterprise Data Center Strategies
Universal City, Calif.,
(203) 226-6382

JUNE 17-18:
Outsourcing Conference
Dallas, (508) 470-3880

JUNE 20-22:
Gartner Group's Client/Server Conference
Scottsdale, Ariz.,
(203) 967-6757

CALENDAR

It's funny – a conference in Tahiti is always more valuable.

JUNE 27-29:
Gartner Group's Next-Generation Applications Conference
San Antonio, (203) 967-6757

JUNE 28-30:
Database World
Sponsored by DCI, Client/Server World, Boston, (508) 470-3880

JUNE 28-30:
Wireless Datacomm
San Jose, Calif., (203) 847-5131

JULY 18-19:
Network Outlook '94
Sponsored by Technologic Partners, San Francisco,
(212) 696-9330

JULY 31-AUGUST 4:
American Association for Artificial Intelligence's National Conference
Seattle, (415) 328-3123

SEPTEMBER 12-14:
Meta Group's Advanced Information Management Strategies
San Francisco, (203) 226-6382

SEPTEMBER 26-28:
Meta Group's Application Development Strategies
Coronado, Calif., (203) 226-6382

OCTOBER 17-19:
Meta Group's Open Computing and Server Strategies
Phoenix, (203) 226-6382

NOVEMBER 7-9:
Second Pan American EDI Users Conference and Exhibit
Sponsored by EDI Association,
Toronto, (416) 621-7160

NOVEMBER 7-10:
Communications Managers Association Telecom '94
(201) 425-1700

DECEMBER 5-6:
The Personal Computer Outlook
Sponsored by Technologic Partners, San Francisco,
(212) 696-9330

DECEMBER 6-8:
Wireless Datacomm
Washington, (203) 847-5131

Management-Oriented Conferences

FEBRUARY 1-2:
Conference Board's Strategic Management Conference
Los Angeles, (212) 339-0290

FEBRUARY 2-4:
Executive Technology Summit
Sponsored by the Society for Information Management and Computerworld, Tarpon Springs, Fla., (800) 884-6473

FEBRUARY 13:
College of Healthcare Information Management Executives' CIO Forum
Phoenix, (313) 665-0000

MARCH 21-22:
Financial Executives Institute's Information Management Issues Conference
Chicago, (201) 898-4600

APRIL 6-7:
Conference Board's Business Re-engineering Conference
New York, (212) 339-0290

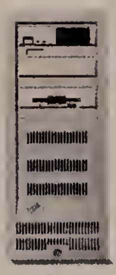
APRIL 13-14:
Conference Board's Management

Brace yourself for the kind of speed and performance that makes other servers look like they're standing still. The newest PS/2® Servers do more than run. They fly.

The new Server 95 Array models are the fastest available. With their bottleneck-eliminating

85 Server

SynchroStream™ controller, IBM PS/2 Servers can exploit the full power of their Pentium™ 66 MHz or 60 MHz chips and 256KB of L2 cache. And we can prove it: in complex workloads using popular workgroup applications, the PS/2 Server 95 Array beat a similarly equipped Compaq SystemPro XL by a


95 Server

Development Conference
New York, (212) 339-0290

APRIL 20-22:
SIM Conference
Ponte Verde, Fla.,
(312) 644-6610

MAY 8-11:
Association for Systems Management's Annual Information Systems Conference
Orlando, Fla., (216) 243-6900

MAY 11-13:
Hammer Forum and Clinic
Boston, (617) 354-5555

MAY 12-13:
Conference Board's Delighting Internal Customers Conference
San Diego, (212) 339-0290

MAY 25-26
Conference Board's Information Management Conference
New York, (212) 339-0290

JUNE 21-22:
Conference Board's Virtual Corporation Conference
New York, (212) 339-0290

AUGUST 17-21:
Black Data Processing Association's National Conference
Cleveland, (800) 727-2372

SEPTEMBER 18-21:
SIM Conference
Salt Lake City, (312) 644-6610

OCTOBER 3-7:
Gartner Group Symposium '94
Orlando, Fla., (203) 967-6757

OCTOBER 31-NOV. 2:
InfoTech '94
Sponsored by the Data Processing Management Association, Louisville, Ky., (708) 825-8124

User Group Meetings

FEBRUARY 20-25:
Share 82
Anaheim, Calif., (312) 822-0932

MARCH 6-11:
Guide International Corp.
San Francisco, (312) 644-6610

MARCH 13-16:
"Re-Visioning IT: Achieving an Enterprise Perspective"
Sponsored by CIO magazine, Orlando, Fla., (508) 935-4461

MARCH 14-16:
Interex Computing Management Symposium
New Orleans, (408) 747-0227
(International Association of HP Computer Users)

MARCH 21-25:
COMMON Spring '94
Anaheim, Calif., (312) 644-6610

APRIL 11-15:
Use, Inc.
Nashville, (301) 577-1881

APRIL 24-27:
NCR Users Conference
Louisville, Ky., (800) CALLNCR

MAY 7-13:
Digital Equipment Computer Users Society
New Orleans, (800) 332-8755

MAY 8-12:
International DB2 Users Group
San Diego, (312) 644-6610

MAY 22-26:
International Communications Association
Dallas, (214) 233-3889

CALENDAR

> You can't hit all the parties at Comdex – just no way.

JUNE 13-17:
INET '94, The Annual Conference of the Internet Society
Prague, 31-20-639-1131

JULY 10-15
Guide International Corp.
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[†] 1993 J.D. Power and Associates Desktop Personal Computer Satisfaction Study. Study conducted among business users in the U.S. and based on 1,956 user respondents. [*] Prices valid in the U.S. only. Some products and promotions not available in Canada or Mexico. [◊] Business leasing arranged by Leasing Group, Inc. The Intel Inside logo is a registered trademark and i486 is a trademark of Intel Corporation. Dell disclaims proprietary interest in the marks and names of others. ©1994 Dell Computer Corporation. All rights reserved.

All that glitters ...

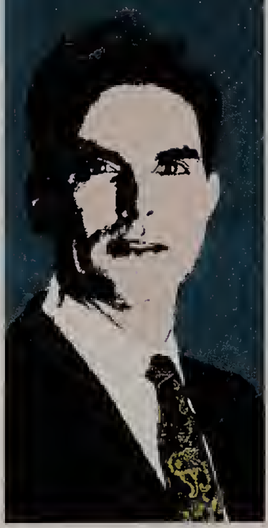
OPINION BY **FRANK GENS**

IN 1994, CLIENT/SERVER technologies will begin to take on enterprise-scale applications, and IS organizations will face the urgent challenge of picking products and suppliers that can stay the course.

Making such a call requires more than simply looking at a list of today's client/server leaders. The history of information technology is full of highfliers that quickly crashed to earth.

The best bet is to look for suppliers that fulfill the seven simple requirements outlined below.

> "MANY CONSIDER OPEN SYSTEMS A USER MOVEMENT AIMED AT LIBERATING CUSTOMERS. BUT OPEN STANDARDS ARE ACTUALLY MORE VITAL FOR SUPPLIERS."



1. Understand who the new competitors are.

Enterprise client/server systems are forcing a convergence of vendors, technologies and cultures from the desktop to the data center. This means competitors will increasingly come from outside suppliers' traditional markets. Vendors that don't understand this will be blindsided.

2. Actively participate in the desktop market.

Why? Because that's where the money is — almost two-thirds of hardware revenues in 1993, to be exact. Vendors that succeed at the desktop will have the most money to invest in new technology and products. Because of this, it is much more vital for large and midrange suppliers to scale down than for desktop suppliers to scale up.

3. Aggressively exploit desktop technologies.

Today's most important technologies are emerging from the heavily funded desktop world. This means that even suppliers of data center products are wise to build products using the best off-the-shelf technologies in the marketplace, and these are most often found on the desktop.

4. Banish "not invented here" thinking.

Ten years ago it was a great virtue to be "vertically integrated." Today, such a strategy is viewed as plain idiotic. It leaves the vendor in an impossible "going-it-alone" position. Yet many suppliers continue to view partnering as a sign of weakness.

5. Recognize that standards are essential for success.

Many consider open systems a user movement aimed at liberating customers. But open standards are actually more vital for suppliers that must increasingly integrate many partners' technologies. Adherence to standards represents the fastest, most cost-effective way to do so.

6. Demonstrate continuity of strategy.

Many suppliers have rushed tactical client/server products to market, giving little thought to how, or if, they fit with existing products and direction. And often, they've given little thought to the future of these products. This knee-jerk approach obviously carries significant risk.

7. Understand IS management disciplines.

Availability and manageability are basic requirements for major business applications — and qualities that many first-generation client/server products lack. They are, however, attributes that data center products generally deliver. Successful suppliers will incorporate the management lessons of the data center into their enterprise client/server products.

Those who play this new game by the new rules will be the ones to bet on as client/server goes enterprisewide. Right now, many companies wouldn't pass that test, including some of the hottest client/server vendors. •

FRANK GENS is vice president at Technology Investment Strategies Corp., a market research firm in Framingham, Mass.

STREET PERFORMERS

Computer industry stocks put on a dazzling show last year with networking and media issues at center stage

ONCE AGAIN, THOSE WILD AND CRAZY computer stocks saved Wall Street from a year of tedium.

Initial public offerings such as **POWERSOFT CORP.** and **NETMANAGE, INC.** provoked feeding frenzies unmatched by anything short of Boston Chicken. **IBM** posted a quarterly loss in the billions, and its share price responded by going up.

KENDALL SQUARE RESEARCH CORP. started at 18, zigzagged to 14, then 25, then plummeted to less than 6.

Even among the cheeriest sectors, such as internetworking stocks, things were rarely steady. Four times in the year, **CABLETRON SYSTEMS, INC.**'s stock gained 10 points in a single week. Five times the stock dropped at least 5 points in a week.

For those who are keeping score, we've pulled together a list of 1993's big gainers and losers.

And who will be the winners in **1994**? We asked three top-notch equities analysts to give their best shot at predicting the coming year. (Unfortunately, we were unable to establish telepathic contact with Jeane Dixon by press time.)

— BY **DEREK SLATER**

MICHAEL MURPHY
CALIFORNIA TECHNOLOGY STOCK LETTER

- •**Sequent Computer Systems, Inc.** Selling into the Fortune 200 with turnkey approach.
- •**Sun Microsystems, Inc.** New products, lots of pent-up demand.
- •**Ross Systems, Inc.** Client/server software sales growing about 80% a year.

CHRIS MORTENSON
ALEX. BROWN & SONS, INC.

- •**Informix Corp.** Low price/earnings multiple among DBMS vendors, OnLine 6.0 shipping soon.
- •**Progress Software, Inc.** An overlooked company, good upside potential.
- •**Manugistics Group, Inc.** Strong applications company.

GEORGE KELLY
MORGAN STANLEY & CO.

- •**Xircom, Inc.** New wireless adapters.
- •**SynOptics Communications, Inc.** Short-term concerns will be resolved.
- •**Cisco Systems, Inc.** Will continue to expand its product offerings and geographic reach.
- •**3Com Corp.** Moving into high gear with hubs and routers.

NO PAIN: THE TOP 10 PERCENTAGE GAINERS IN 1993

MICROAGE, INC.	DSC COMMUNICATIONS CORP.	BOLT, BERANEK & NEWMAN, INC.	CENTIGRAM COMMUNICATIONS	LOTUS DEVELOPMENT CORP.
+366%	+170%	+168%	+167%	+164%
EMC CORP.	NEWBRIDGE NETWORKS CORP.	ORACLE CORP.	MICRON TECHNOLOGY	COREL CORP.
+161%	+155%	+151%	+149%	+149%

NO GAIN: THE TOP 10 PERCENTAGE LOSERS IN 1993

COGNITRONIX CORP.	CAMBEX CORP.	NETRIX CORP.	EASEL CORP.	DIGITAL SYSTEMS INTERNATIONAL, INC.
-71 %	-70 %	-70 %	-70 %	-69 %
POLICY MANAGEMENT SYSTEMS CORP.	MICRO FOCUS, INC.	KENDALL SQUARE RESEARCH CORP.	IOMEGA CORP.	MAXTOR CORP.
-69 %	-63 %	-60 %	-59 %	-59 %

Source: Nordby International, Louisville, Colo.

Recreating the Mainframe

YOUR MAINFRAME ISN'T DEAD, BUT IT'S SURE looking a lot different. The wide-area network is replacing the backplane; the workstation is supplanting the terminal. Corporate information systems is remaking the functions and features of the mainframe in the form of the company network, only without all the nice controls and management features. The tools are on the way, but for now, reinventing the mainframe is a nail-biting experience. The future will see a multiplatform, multivendor conglomeration of machines and software, each good at doing a few things well. All IS has to do is make it work.

IN THIS SECTION

REAL COST

The real costs of client/server are about as tough to figure out as the payback.

PAGE 44

SNA is finally poised to become a good citizen in the internetworked world.

PAGE 48

CW SURVEY

47%

of users surveyed have experimented with client/server, but that means the rest haven't.

PAGE 49

CLIENT/SERVER TOOLS

Don't bet the store just yet

Distributed management tools approach the mainframe in capability

BY GARY H. ANTHES

THE CLIENT/SERVER INFRASTRUCTURE MAY NOT be quite ready to support mission-critical applications, but significant improvements in tools for distributed computing will be made in the coming year.

Jerrold M. Grochow, chief technology officer at American Management Systems, Inc. in Arlington, Va., says products for testing and software distribution are especially weak, but he predicts substantial improvements in the next year or two.

However, Robert Yellin, chief technology officer at Legent Corp., a systems management software vendor in Herndon, Va., is slightly more conservative. Yellin points to gaps in systems management software and notes that industrial-strength Unix applications running in industries such as finance and insurance are carefully and laboriously crafted by in-house developers.

Yellin explains that any individual component — such as Unix, a database management system or a teleprocessing monitor — may appear to have every necessary feature, but when they are combined, unexpected "dysfunctions" emerge. As a result, Yellin estimates that users will not get the 99.96% uptime available from mainframe systems in their client/server networks with off-the-shelf software for four to five years.

JUST KEEPS GETTING BETTER

This year, Yellin predicts, users will see further emergence and improvement of standard network management systems such as Hewlett-Packard Co.'s OpenView, IBM's NetView/6000 and Sun Microsystems, Inc.'s SunNetManager. He also says users should watch for the rollout of more products using "middleware" (which provides common services across multiple platforms and hides ugly interfaces from users) based on technology from organizations such as the Open Software Foundation and PeerLogic, Inc. in San Francisco.

Some users dispute the contention that it is unsafe to move out of the glass house. They

TURNER'S JOHN GOOD: For client/server success, users should treat the network as if it were the glass house

PHOTOGRAPHY: BRIAN SMALE

“CLIENT/SERVER OUGHT TO COME WITH A LABEL SAYING: ‘MISUSE OF THIS COULD BE HARMFUL TO YOUR HEALTH.’”

JAMES DALY
DIRECTOR OF HUMAN RESOURCES ADMINISTRATION
NEW ENGLAND TELEPHONE CO.

point with pride to LAN servers where mainframes once stood.

Several years ago, for example, DynCorp in Reston, Va., moved everything off its small mainframes and never looked back. Butch Fernstrom, MIS director at DynCorp, says features such as backup, recovery and security are available in the LAN environment. DynCorp fitted each file server with redundant disk arrays and controllers and beefed up one desktop machine to act as a substitute server if the main server went down.

TRYING OUT CLIENT/SERVER

Like DynCorp, the city of San Antonio found that by using redundant components it could move mission-critical applications — in this case, its 911 emergency dispatch system — to client/server. In making the move from an Amdahl Corp. 5995-700 mainframe to a LAN built around NCR Corp. servers and PCs, the city bought extra protection in the form of NCR's LifeKeeper, which links redundant computers for fault tolerance.

“We've built a lot of redundancy into the server. We have the disks covered and the CPUs covered,” says Frank Stromboe, director of information services for the city. The network is the weak link — the most likely to fail, he adds.

Users who have gone all the way to distributed systems say it is important not to get too fancy. For example, when Turner Corp. in New York moved everything to client/server in the late 1980s, it elected not to set up local subsets of the human resources databases at remote sites because of potential problems keeping the databases synchronized.

Turner now has several thousand users on 60 LANs across the U.S., and the New York-based mainframe is fading from memory. John Good, director of information technology and systems support, says Turner has ensured reliability by choosing excellent technical people, buying from vendors with good track records and treating LAN gear with the same care traditionally given to equipment in the glass house.

“Just because it's on a PC doesn't mean we can shove that into a hot closet and forget about it,” Turner says.

DEVELOPMENT AN OBSTACLE

Some say the hardest thing about client/server is designing and developing the applications, not running them. David MacSwain, marketing vice president at Software AG of North America, Inc. in Reston, Va., says there are a couple of reasons for this. One is the difficulty in choosing which of several distributed computing models makes the most sense for each application. Another is that no vendor has yet overcome the difficulty of managing large software development projects in distributed environments.

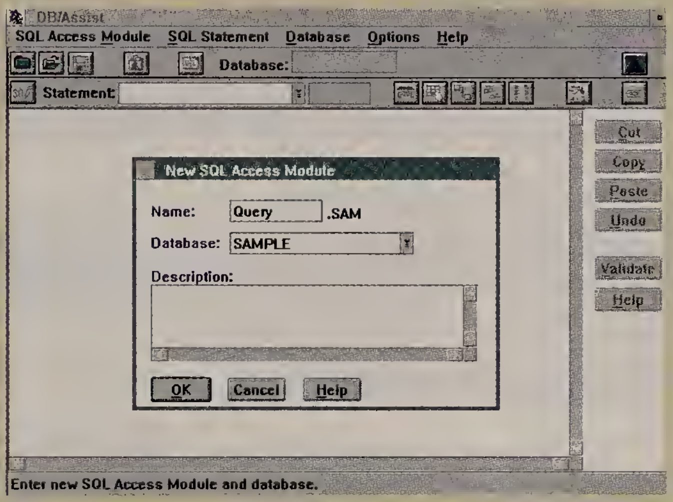
Software AG hopes to eventually offer tools that will address both issues, but don't look for them soon. There are plans for automated tools to evaluate different computing models and their various trade-offs, but those won't hit the market for 18 to 36 months.

And as for software development management solutions, those are at least two years — and possibly three years — away. ●

GET YOUR APPS TOGETHER

EMERGING PRODUCTS CAN GIVE OLD SYSTEMS THAT CLIENT/SERVER FEEL

THE MOST EXPENSIVE ASPECT OF DOWNSIZING ISN'T THE cost of the equipment but the job of integrating existing applications with the new ones built to run PC servers. Short of taking the most expensive route and actually rewriting entire applications, IS managers have three basic strategies at their disposal:



Name: Query .SAM

Database: SAMPLE

Enter new SQL Access Module and database.

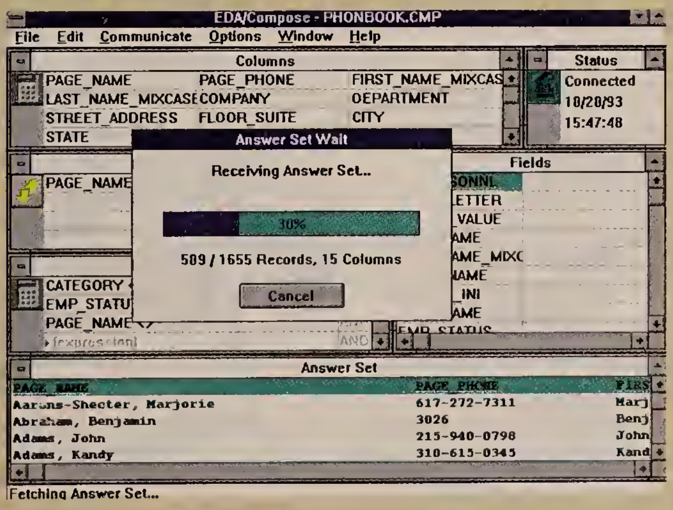
EASEL'S DB/ASSIST

1. Screen scraping

The easiest approach is simply to give existing applications a face-lift by redesigning the user interface with frontware tools such as those from Easel Corp. in Burlington, Mass., Mozart Systems Corp. in Burlingame, Calif., and Intelligent Environments, Inc. in Tewksbury, Mass.

Generally referred to as screen scrapers, these tools essentially expand upon terminal emulation to give users a tool for querying and downloading data from a mainframe to a PC application running a graphical user interface.

While this method does nothing to reduce mainframe investment, it at least provides a quick way to give users a graphical front end to a well-entrenched application.



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LAST_NAME_MIXCASE COMPANY DEPARTMENT
STREET_ADDRESS FLOOR_SUITE CITY
STATE

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15:47:48

Receiving Answer Set...

30%

509 / 1655 Records, 15 Columns

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Abraham, Benjamin	3026	Benj
Adams, John	215-940-0798	John
Adams, Kandy	310-615-0345	Kand

Fetching Answer Set...

INFORMATION BUILDERS' EDA/COMPOSE

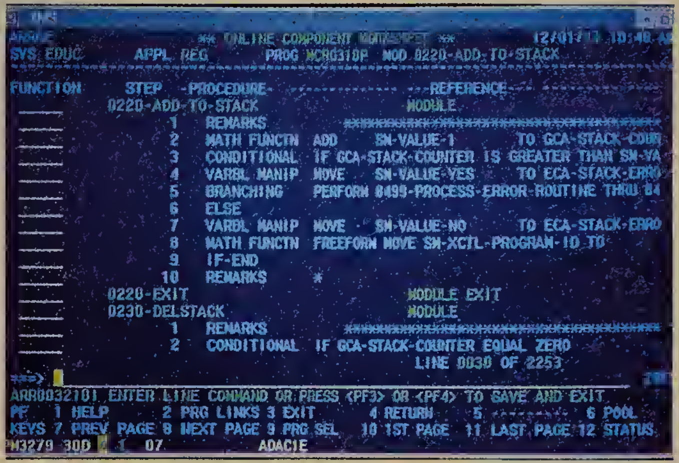
2. Placing calls from the gateway

A second tack that information systems managers can take is to plug PC-based client/server applications into SQL gateways that are capable of calling data from both relational databases and flat file systems. Just about all the major database vendors offer SQL gateways, including Oracle Corp., Information Builders, Inc., Sybase, Inc. and The ASK Group, Inc.'s Ingres Products Division.

This approach allows IS managers to support a large number of users by deploying a few dedicated servers to run the gateway software. This frees the mainframe from having to process each SQL individually.

Chevron Corp. in San Francisco chose this option when it decided to revitalize an IBM IMS accounting application for about 75 users. Instead of completely rewriting the application, Chevron augmented the batch-oriented portion running in IMS with a subsystem written in PowerBuilder from Powersoft Corp. in Burlington, Mass., that accesses DB2 as a front end to the IMS system. A SQL gateway from Oracle provides the connection between the DB2 and IMS systems.

According to Donald Weimann, a Chevron staff specialist, the benefit of this approach is that it still keeps the primary logic for the application on a mainframe but allows Chevron to give its users PC tools.



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FUNCTION     STEP  -PROCEDURE- ------------ ---REFERENCE---
             0220-ADD-TO-STACK                 MODULE
 _______           1   REMARKS       ************************************
 _______           2   MATH FUNCTN  ADD    SM-VALUE-1        TO GCA-STACK-COUN
 _______           3   CONDITIONAL  IF GCA-STACK-COUNTER IS GREATER THAN SM-VA
 _______           4   VARBL MANIP  MOVE   SM-VALUE-YES      TO ECA-STACK-ERRO
 _______           5   BRANCHING    PERFORM 8499-PROCESS-ERROR-ROUTINE THRU 84
 _______           6   ELSE
 _______           7   VARBL MANIP  MOVE   SM-VALUE-NO       TO ECA-STACK-ERRO
 _______           8   MATH FUNCTN  FREEFORM MOVE SM-XCTL-PROGRAM-ID TO
 _______           9   IF-END
 _______          10   REMARKS      *
             0220-EXIT                         MODULE EXIT
             0230-DELSTACK                     MODULE
 _______           1   REMARKS       ************************************
 _______           2   CONDITIONAL  IF GCA-STACK-COUNTER EQUAL ZERO
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PF    1 HELP         2 PRG LINKS 3 EXIT         4 RETURN     5 ---------   6 POOL
KEYS 7 PREV PAGE 8 NEXT PAGE 9 PRG SEL   10 1ST PAGE  11 LAST PAGE 12 STATUS
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TEXAS INSTRUMENTS' COMBO

3. Automated reconstruction

If eliminating the mainframe is an all-consuming passion for some companies, a number of vendors offer high-level tool sets that are capable of analyzing the logic in an application and re-engineering it for client/server deployment. They include Viasoft, Inc., Texas Instruments, Inc., KnowledgeWare, Inc. and Netron, Inc.

Based largely on technology created for computer-aided software engineering (CASE) products, these tools typically have the ability to ascertain which parts of the application no longer have an appropriate function. This helps keep downsizers from replicating some of the outdated or faulty logic that has crept into the mainframe application over the years.

On the downside, these tools typically require IS shops to hire consultants who are conversant in the CASE languages on which the tools are based. Such projects typically involve a long deployment cycle during which the applications on the mainframe have to be run alongside the new client/server application.

For many IS shops, re-engineering a mainframe application doesn't make a lot of fiscal sense, especially if that application is at the end of its useful life cycle.

— BY MICHAEL VIZARD

Cost confusion

What's the real cost of client/server? It depends on who you ask.

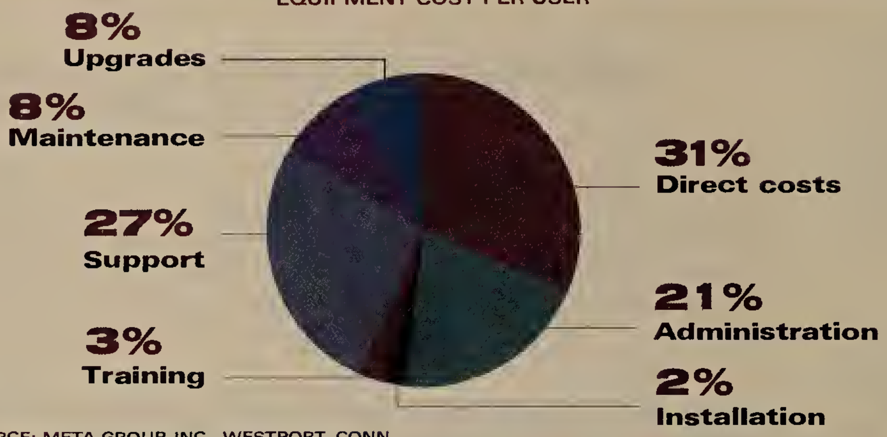
META GROUP, INC. PEGS THE AVERAGE COST PER USER AT ABOUT $17,000 OR $3,400 PER YEAR OVER FIVE YEARS . . .

	FIVE-YEAR TOTAL
Hardware	2,654
Server hardware	285
Shared peripherals	164
Network equipment	445
Client software	1,588
Server software	117
Internetworking	56
DIRECT COSTS	**$5,309**
Installation	285
Administration	3,600
Training	529
Support	4,867
Maintenance	1,487
Software upgrade	938
INDIRECT COSTS	**$11,706**
TOTAL COSTS	**$17,015**

SOURCE: META GROUP, INC., WESTPORT, CONN.

. . . BUT NOTES THAT EQUIPMENT ACCOUNTS FOR LESS THAN ONE-THIRD OF THE TOTAL COST

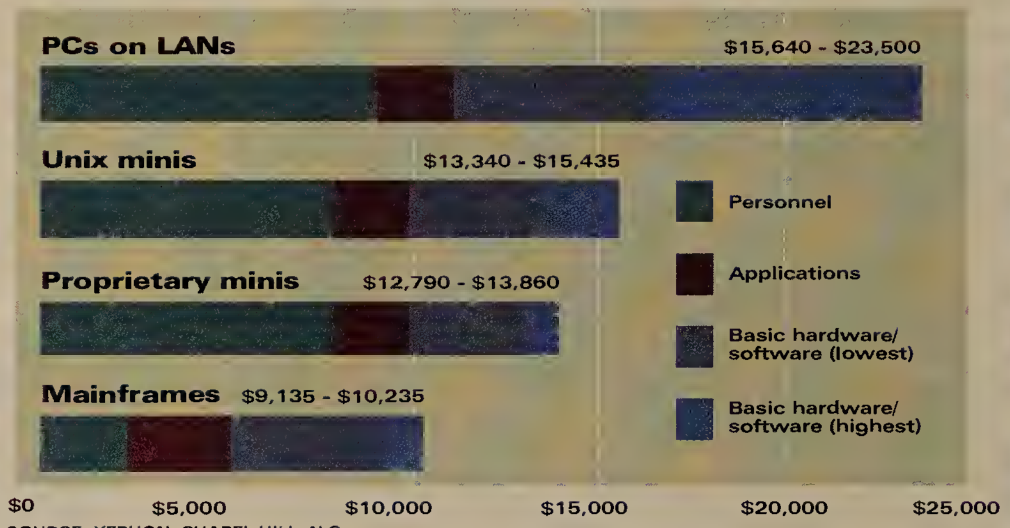
EQUIPMENT COST PER USER



SOURCE: META GROUP, INC., WESTPORT, CONN.

XEPHON SAYS THE COST PER PC IS MUCH HIGHER BECAUSE PERSONNEL ARE SO EXPENSIVE . . .

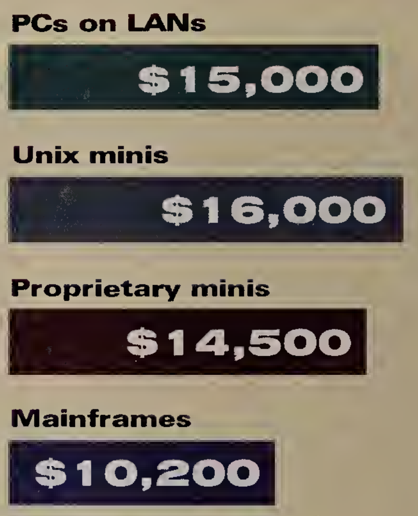
FIVE-YEAR COST PER END USER, 1993



SOURCE: XEPHON, CHAPEL HILL, N.C.

. . . AND THINGS WON'T GET MUCH CHEAPER OVER TIME

FIVE-YEAR COST PER END USER, 1998*



SOURCE: XEPHON, CHAPEL HILL, N.C.

*ESTIMATED

MISSING PIECES

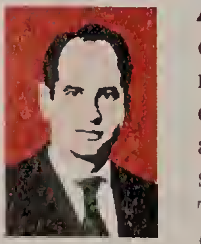
USERS SOUND OFF ABOUT WHY DIVERSE CLIENT/SERVER INSTALLATIONS ARE SO DIFFICULT TO MANAGE

EVEN CORPORATIONS that are aggressively moving their mainframe applications down to client/server platforms are doing so with trepidation. What follows is a sampling of paraphrased views from information systems managers on what has to change and emerging products and standards that promise to start addressing some of the gaps within the next year:

CLIENT/SERVER LACKS the maturity of the glass house environment in areas such as data integrity, security and recovery.

The ideal would be industrywide standards that save corporations from having to replicate technical staffs with expertise in each of those particular platforms and have separate test equipment for each, but "that can be very expensive."

WADE BROWN, EXECUTIVE VICE PRESIDENT
AND CHIEF INFORMATION OFFICER,
WASHINGTON NATIONAL INSURANCE CO.,
LINCOLNSHIRE, ILL.



A CONSISTENT CORE curriculum is needed for retraining IS managers in developing, implementing and managing client/server environments. This should not vary from vendor to vendor.

DONALD STERNFELD, DIRECTOR OF IS,
MORGAN, LEWIS & BOCKIUS,
PHILADELPHIA

WE NEED products that track software licenses and vendor contracts throughout the company. We also need products for managing "open" client/server installations on a par with what's now available on the mainframe.

GENE FRIEDMAN, VICE PRESIDENT
OF APPLIED TECHNOLOGY,
THE CHASE MANHATTAN BANK NA,
NEW YORK

WHAT'S MISSING are standardized user sign-on protocols and a universal system for managing security across a heterogeneous client/server environment. "Today, you manage things one by one."

STASH JAROCKI, VICE PRESIDENT,
DIRECTOR IN CORPORATE AUDIT,
CITIBANK NA, NEW YORK

NOBODY IS providing supporting applications that use a mixture of protocols such as Novell, Inc.'s IPX and TCP/IP but don't require you to support multiple protocol stacks on the desktop. A mixed environment must "behave in ways that make your life reasonable as a systems manager."

GEORGE REID, DIRECTOR OF IS,
SANFORD C. BERSTEIN & CO.,
NEW YORK

OBJECT-ORIENTED PROGRAMMING

Handle with care

Corporate IS toys with object orientation, but few people are ready to get serious

BY JOHANNA AMBROSIO

OBJECT-ORIENTED PROGRAMMING tools are definitely on the computer industry's "in" list for 1994. But early users are finding that going object-oriented isn't a panacea.

End-user packages such as Microsoft Corp.'s Excel and Lotus Development Corp.'s 1-2-3 are moving upscale and meeting many users' needs just fine.

And complicating things, at least for the time being, is the likelihood that nonobject-oriented will continue to underlie corporate-wide database technology at least through the end of the decade.

Henry Cortinas, senior consultant at The Systems Consulting Group, Inc. in Miami, says that 1993 was "the year of the pilot. This year, 1994, will be when a large percentage of companies will be doing actual development."

Long John Silvers, the restaurant chain based in Lexington, Ky., has developed three applications using Powersoft Corp.'s PowerBuilder, which supports object-oriented features.

Mark Sievers, vice president of information and technology services at Long John Silvers, says sometimes this kind of technology is beyond the scope of the required application. For example, a system that brings together data or applications from many sources makes sense under object-oriented techniques. But for a quick-hit end-user application, Lotus 1-2-3 may do the trick.

"It depends on what you're trying to do," Sievers says. "There's no one strategy that fits for every problem."

NOT ALWAYS THE ANSWER

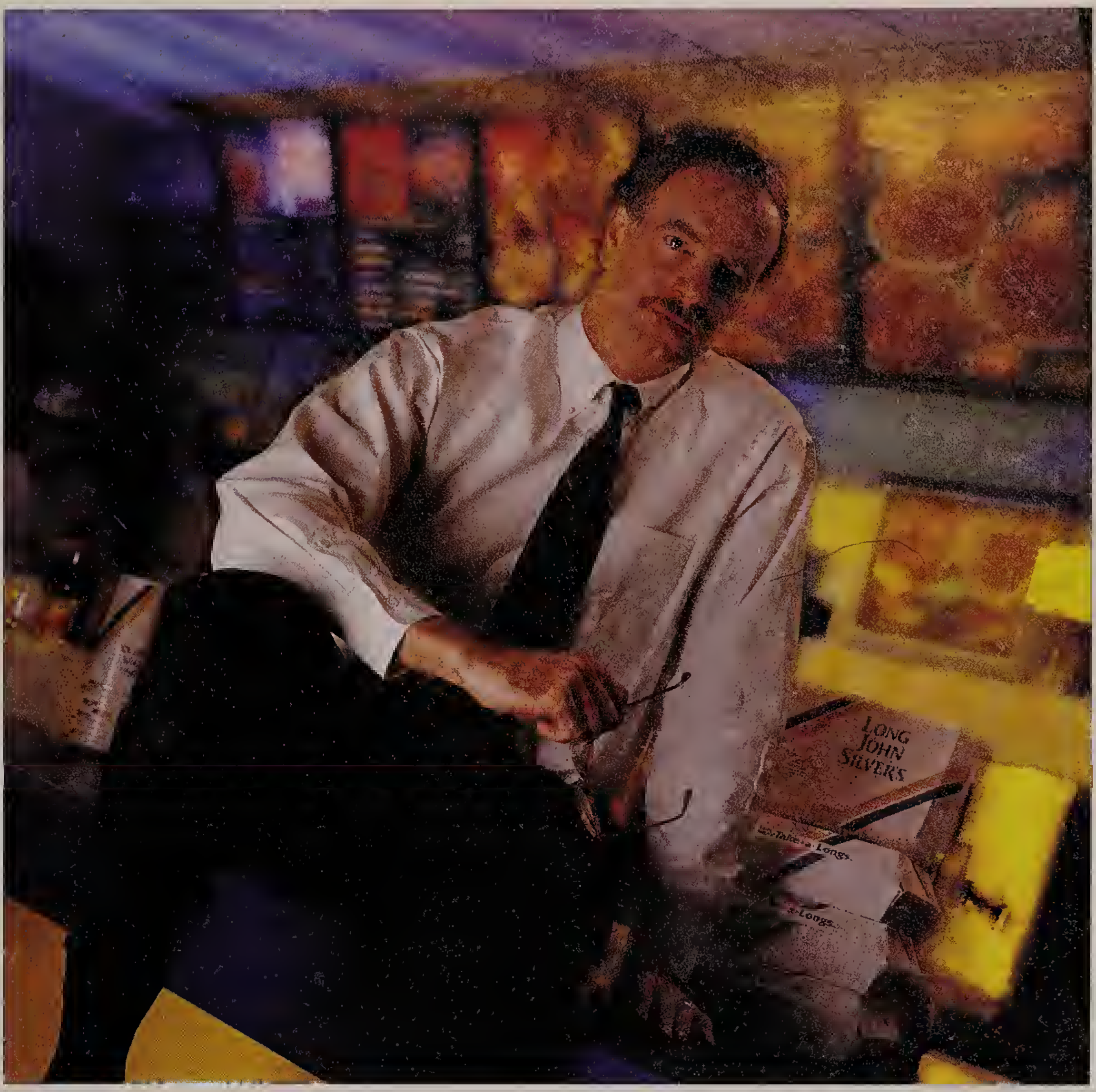
Philip Fasano, managing director at Bankers Trust Co. in New York, agrees. "Object-oriented is not a silver bullet for everything," he says. "You clearly shouldn't use it to build the core of a transaction processing system."

Object tools are most helpful, he says, "when you want to build an institutional-strength application and leverage it across multiple areas and reuse those objects across one or more business areas."

After about 18 months of learning and using object tools, Fasano says Bankers Trust's developers reuse about 75% of the objects they create. "That is where you see the benefit of object technology."

Agway, Inc. in Syracuse, N.Y., has been reaping the benefits for some time: It implemented a mainframe-based object development system in Cobol back in 1985.

Dave Dischiave, director of systems support said that since the company began using its libraries of internally created objects, programmer productivity has increased by a factor of 10. "We don't write programs anymore, we assemble them — kind of like a little General Motors," he says. •



MARK SIEVERS OF LONG JOHN SILVERS advises caution in using object-oriented tools. Although the restaurant chain is using the technology, Sievers says 1-2-3 macros may solve most problems better. However, he says, "There's no one strategy that fits for every problem."

Parallel universe: Few ready to live there

BY JOHANNA AMBROSIO

PARALLEL PROCESSORS ARE EVOKING LOTS of interest, but odds are they won't take over the host slot in most commercial user shops before 1997.

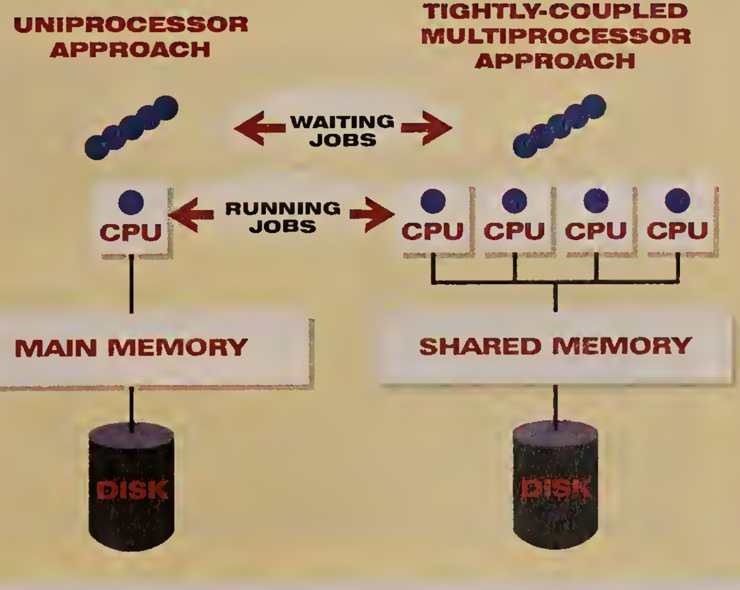
IBM was the most recent entry into the parallel race [CW, Nov. 15], but within the past few years, Kendall Square Research Corp., NCube, Encore Computer Corp., Pyramid Technology Corp., NCR Corp. and others have all introduced machines.

Most of the new crop of high-end machines offer lower costs and higher speeds than the mainframe. Massively parallel processors — those with 100 or more engines — can outperform the mainframe by 100 to 1 or more.

Kansas City Power & Light Co. in Missouri plans to retire its three Unisys 2200 mainframes in late 1995 and is moving all of its applications to Unix boxes, some of them parallel machines. "We're saving 50% a year over the cost of the old mainframes," says Wayne Boggs, director of information technology.

What's the diff

Multiprocessing is one of several new ways to harness the power of many off-the-shelf CPUs



Source: Sun Microsystems, Inc.

But software gaps will hold back the majority of mainframe shops for now. Early users have had to roll their own parallel versions of job schedulers and communications mechanisms between the new and old worlds.

The situation is easing somewhat as systems vendors and the third-party software community have started to address the need for mainframe-like management tools. However, off-the-shelf parallel commercial applications are still rare.

Several database vendors are working with — or already running on — parallel machines. Candle Corp. and BEZ Systems, Inc. in Deerfield, Ill., provide capacity planning and other tools for the new IBM database query parallel computer, among others.

But the sheer volume of batch jobs, which can run in the thousands each night, is the stopper. No one has successfully broken those up into little pieces to run on individual processors.

"Mainframes have a role in batch for a long time, if not forever," says Richard Winter, an independent consultant in Cambridge, Mass. •

PHOTOGRAPHY TOM ROGOWSKI

Progress introduces application developm

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ent software with significantly more depth.

These days, everybody and their brother is offering client/server development software with GUI capabilities. GUI, that is, and not much else. Now, introducing PROGRESS® Version 7. The client/server development software with an unprecedented mix of graphical capability and depth. And the only GUI development tools powerful enough to take you from pilot projects to even the toughest mission-critical, client/server applications.

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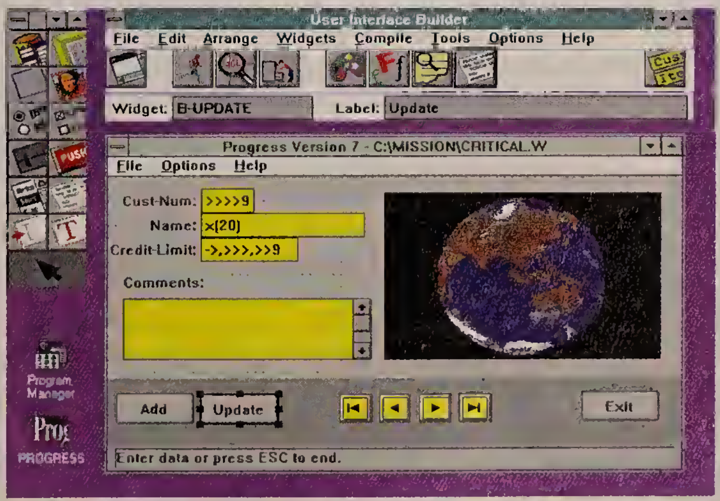

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PROGRESS VERSION 7. MISSION-CRITICAL MEETS CLIENT/SERVER.

That SNAke in the grass is finally being charmed

Hard to combine your SNA net with your LANs? Help is around the corner.

BY JOANIE M. WEXLER

WORRIED THAT YOU'LL NEVER find a straightforward way to transfer data across the SNA/LAN divide?

Relax. Next year will deliver the tools for the integration job: standard router-based SNA encapsulation schemes and Advanced Peer-to-Peer Networking (APPN) support, the ramp-up of frame-relay networking and "middleware-like" integration software.

The technologies to finally allow SNA/LAN coexistence as peers will solidify in standard form. These schemes are geared to preserve SNA's class of service in terms of network availability and response time — a key challenge in fitting SNA onto networks where it now has to share bandwidth with greedy LAN traffic.

The key technologies include Data Link Switching (DLSw), APPN Network Node and IBM's AnyNet software.

DLSw and APPN support on routers will become available from most players, including Wellfleet Communications, Inc., Cisco Systems, Inc., Proteon, Inc. and 3Com Corp. DLSw is a standard way to encapsulate SNA and NetBIOS traffic in packets across now-ubiquitous TCP/IP backbones. It "fools" source SNA applications into thinking a connection has been made so sessions do not die.

APPN is the "new generation," routable SNA that retains hooks to legacy SNA applications and preserves companies' investments in SNA expertise. Routers will be able to fold native APPN right onto IP backbones with no accompanying encapsulation overhead.

"These are key developments for 1994, because IBM/LAN integration is the last internetworking frontier," says Charlie Robbins, director of communications research at Aberdeen Group, a consultancy in Boston.

However, Glenn Brown, a consulting network analyst at Lithonia Lighting in Conyers, Ga., says he does not have short-term plans to implement the newfangled schemes because he has more immediate concerns surrounding the mere speed of time-sensitive SNA traffic over wide-area links.

"In 1994, we'll probably be looking at the speed of IGRP2," the next version of Cisco's proprietary routing algorithm, he says. IGRP allows routers to automatically update one another networkwide when a configuration changes.

WHAT ELSE TO DO?

Another salve for SNA's delivery-time sensitivity is maturing frame-relay technology, says Todd Dagres, vice president of data communications research at The Yankee Group, a consultancy in Boston.

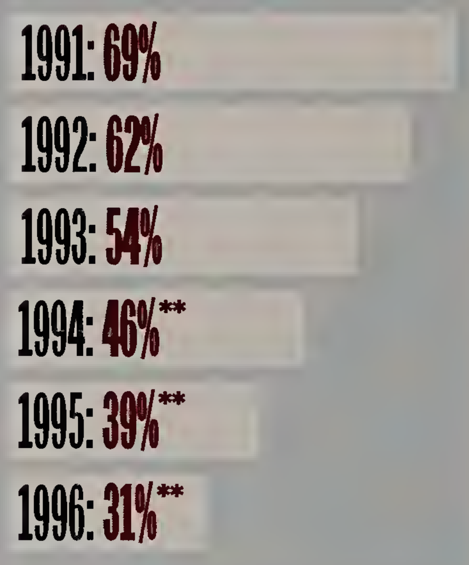
Some users may opt for IBM's emerging AnyNet software as their integration foundation. AnyNet is the embodiment of IBM's Networking Blueprint, a master plan for transport-independent networking.

The idea is to allow applications designed for one underlying transport network to run across others. For example, SNA could traverse IP or Novell, Inc. IPX networks and vice versa. •

Traveling companions

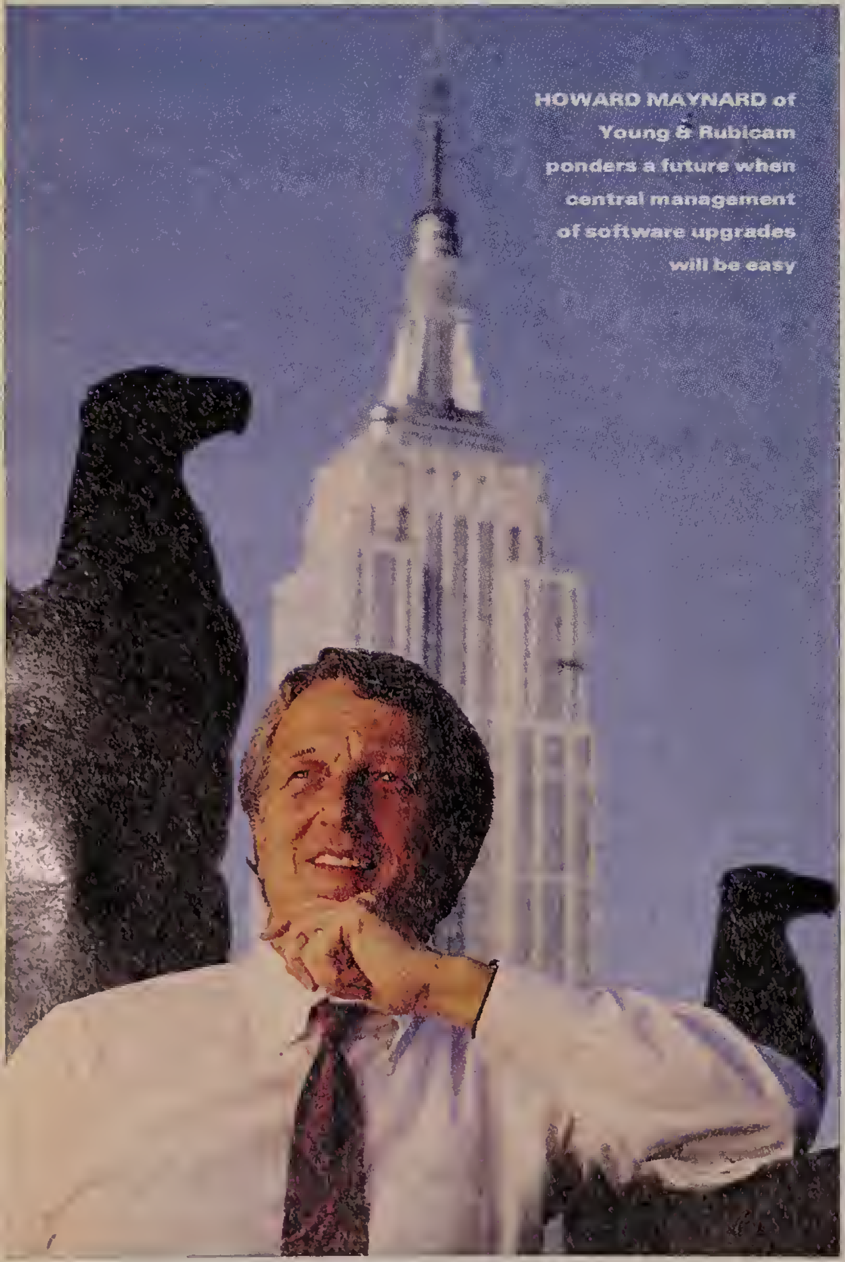
The emergence of other protocols on corporate backbones is spurring encapsulation schemes and reducing the amount of native (unprotected) SNA

PERCENTAGE OF BACKBONE WAN TRAFFIC THAT IS NATIVE SNA*



*Does not include encapsulated SNA traffic
**Projected

Source: The Yankee Group, Boston



HOWARD MAYNARD of Young & Rubicam ponders a future when central management of software upgrades will be easy

Perimeter control

If you're wrestling with managing a distributed operation, help is finally on the way

BY JOANIE M. WEXLER

CORPORATE INFORMATION systems organizations will spend much of 1994 trying to regain some measure of centralized control over proliferating networks, but they can expect considerable assistance from suppliers.

For example, several vendors are readying products that will help customers plan and optimize expensive wide-area bandwidth: Symplex Communications, Inc. in Ann Arbor, Mich., will introduce a product line that gives remote offices LAN-like performance but eases planning, installation and support.

Ascend Communications, Inc. in San Francisco plans to release a bandwidth management device that can track all applications within a corporation — including voice, LAN and video traffic — and dial up the appropriate bandwidth on demand.

Remote access vendor Centrum Communications, Inc. in San Jose, Calif., will add accounting- and security-oriented network management applications to its existing software.

FEWER PLATFORMS IN '94

The year will also see greater platform consolidation of network management systems, "allowing users to merge the logical LAN with the physical network," says Todd Dagres, vice president of data communications research at consultancy The Yankee Group.

Dagres says mergers such as those between smart hub maker SynOptics Communications, Inc. and Novell, Inc. and between router vendor Cisco Systems, Inc. and Microsoft Corp. will help users manage the network "as an entity rather than as a collection of smaller networks."

Vendors will also provide help for those struggling to keep software upgrades consistent across the enterprise.

This is a pressing concern for Howard Maynard, director of MIS at global advertising agency Young & Rubicam, who says upgrading a worldwide framework that includes Novell LANs, Notes servers and CC:Mail gateways is "a staggering task."

NetLabs, Inc. in Los Altos, Calif., hopes it can make the job less staggering in 1994, with an automated asset management system that collects depreciation, warranty and other data on remote devices in a central database.

Meanwhile, hubs and routers will converge, combining many communications functions, including resource configuration for virtual workgroups, into centrally managed "superboxes."

Cabletron Systems, Inc., SynOptics and others are currently at work on such devices. •

PHOTOGRAPHY BOB SACHA

Mainframe pulse check

Rumors regarding the death of the mainframe have been greatly exaggerated. Big iron is alive and well in the vast majority of IS organizations sampled in our annual Forecast survey. Two-thirds of the IS organizations we surveyed have not moved any critical applications off the mainframe. Within two years, half of them will still not shift key systems off these large-scale platforms. Sixty percent say that mainframes will be either very critical or somewhat critical to their operations five years from now. For those that have tried client/server, most say these projects cost more than mainframe application development projects. But 29% say that client/server performance is better. Bottom line: While client/server offers some advantages, most shops are not ready to risk key applications on alternative platforms yet.

EXCLUSIVE CW SURVEY

PROGNOSIS DIVIDED ON HOW CRITICAL MAINFRAMES WILL BE IN FIVE YEARS:

28% VERY CRITICAL

18% NOT AT ALL CRITICAL

SLOW BUT STEADY MOVEMENT OF KEY APPLICATIONS TO SMALLER PLATFORMS:

27% 1993

44% 1995

EXPERIMENTING WITH CLIENT/SERVER:

47% HAVE

55% HAVE NOT

BIGGEST CLIENT/SERVER STUMBLING BLOCKS

ON A SCALE OF 1 TO 10, WHERE 1 IS THE LEAST DIFFICULT AND 10 IS THE MOST DIFFICULT

5.8 ACHIEVING ACCEPTABLE PERFORMANCE

5.6 COST-EFFECTIVE APPLICATION DEVELOPMENT

5.4 RELIABILITY

PULLING THE LAST BIG PLUG:

13% HAVE ALREADY DONE IT

LESS THAN **3.5** YEARS IS THE MEAN FOR OTHERS WHO SAY THEY WILL

PEOPLE TO WATCH

Hadi J. Polynin, Karsten Manufacturing Corp.

For **IS director Polynin**, large-scale parallel processing is yesterday's news. In 1989, Polynin decided his company, a Phoenix manufacturer of custom golf clubs, could benefit from parallel processing. So he installed a Teradata Corp. 16-processor machine (capable of scaling to more than 1,000 processors) to handle transaction processing. While there were locking and language compatibility problems to work out, the IS group solved these with workarounds and custom interfaces. New hot projects include deployment of parallel technology for general-purpose computing and figuring out ways to use multimedia as a user interface that's more intuitive than today's GUIs. Look for Polynin's name in the bookstores midyear. He's co-authoring a book on the business and technical impact of massively parallel processing, relational, object-oriented and multimedia technologies.

POLYNIN

Richard Freyberg, Bankers Trust Co.

Managing director Freyberg excels in small talk — make that Smalltalk. And he's betting on the object-oriented language to revitalize Bankers Trust's commercial lending business. "We need one integrated visionary system if we're going to stay in business in commercial lending," he says. Freyberg is two years into a four-year effort to re-engineer the bank's 20-year-old commercial lending system. One of the thorniest problems — and one he hopes object-oriented technology will help attack — is that few at the bank know how to maintain the current system. Why Smalltalk? Because when you're trying to build a single worldwide system to do the job of 20, the ability to experiment and rework is critical. Freyberg says object orientation makes it relatively easy to change applications. Partly to recoup project costs, co-developer IBM is selling the system. First Chicago and Continental Bank are the first takers.

FREYBERG

Terry Jones, Sabre Computer Services

Weary travelers will soon be thanking **Jones, president** at AMR Corp.'s 2,000-strong Sabre Computer Services Division. His group's forays into wireless technologies will one day allow travelers to check on schedules and rearrange flight times from portable computers. To meet what Jones calls the "explosion of portable automation," 10 members of his advanced technology group are investigating wireless technology, including radio frequency, cellular and Cellular Digital Packet Data, which promises to make use of the existing cellular infrastructure. Other wireless applications that are either deployed or undergoing experimentation include aircraft deicing notification, ticketing, cruise ship check-in and baggage claim. When can we expect these changes? "We'll be testing the wireless check-in system in the first quarter of 1994," Jones says. He says he foresees an ongoing study of wireless technology.

JONES

ValuePoint™ Pentium™ technology.

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This is due in large part to IBM's dedication to building a computer that takes full advantage of the Pentium chip itself. Offering graphics performance of over forty-two million WinMark™s, it's more than twice as fast as our 486DX2-66.* And with the latest local bus PCI architecture, it gives you graphics capabilities that make everything you do look better. Featuring Megapel resolution or true color standard and video memory upgradable to 2MB. All of which make it ideal for even the most sophisticated imaging and multimedia needs.

*P60/D available starting at $4,999,** including 15″ SVGA monitor.*

It also offers double the capacity of any standard 486, with 16KB of L1 Cache and 256K L2 Cache. What's more, this chip acts like it has a mind of its own. In fact, it's almost clairvoyant. Which means that the P60/D can put

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60 MHz Pentium processor	• Intel®*'s next generation of high-speed microprocessor technology • 64-bit processor bus for enhanced throughput
256KB L2 Cache standard	• Maximizes Pentium processor speed of operation
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PCI local bus graphics	• Superior high-end graphics performance • Megapel resolution standard
16MB memory standard	• Improves speed of high-performance operating systems
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the information you need right at hand 95% of the time.

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[*] WinMark performance measured by running WinBench™ version 3.11 at 1,024 x 768 x 256 colors at 70 Hz [**] IBM prices, dealer prices may vary. [†] Information or copies of IBM limited warranty are available upon request. [††] In Canada, call 1 800 465-7999. IBM, HelpWare and HelpCenter are registered trademarks and ValuePoint is a trademark of International Business Machines Corporation. The Intel Inside logo is a registered trademark and Pentium is a trademark of Intel Corporation. All other products and brand names may be trademarks or registered trademarks of their respective owners. © 1993 IBM Corp.

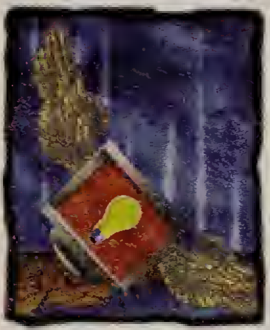
Easy Promises/Hard Realities

YOUR SPOUSE SAYS YOU'VE TURNED INTO A CYNIC. IS IT ANY wonder? You've heard so many sell lines about miraculous devices, magic-bullet tools and no-training-needed packages that you automatically check with three people just when you need to know the time.

But that's OK. You've figured out how to find reality through the haze: You simply add a year to most release date estimates, subtract several thousands from reported installed base, factor in an extra third to cover unmentioned incidentals, assume a baker's dozen of bugs and never, ever take the word "seamless" literally. Just think of it as survival math.

IN THIS SECTION

You want support tools that will get you the right data to answer today's big question without a lot of painful fumbling? Maybe tomorrow.
Page 53



Just hook those systems up and they'll all play together nicely. Yeah, sure. Like Serbs and Croats.
PAGE 57

Just face it: There'll ALWAYS be a backlog.
PAGE 58

OUTTAKE

"Too often what is delivered is what's easy to automate and put on a screen. It's a good cover on a bad book."
JENNE HARRIS, ANDERSEN CONSULTING

THIS IS PROGRESS?

One-minute Advantage

Good news: Competitive advantage is real Bad news: It disappears in a flash

BY **MELINDA-CAROL BALLOU** AND **DEREK SLATER**

ILLUSTRATION: JAMES STEINBERG

COMPETITIVE ADVANTAGE AIN'T what it used to be. Just a few tumultuous years ago, it was possible to put a stranglehold on a market using information technology. (Remember those twin colossi, AMR Corp.'s Sabre and American Hospital Supply?) Of course, corporations still seek information-enabled market advantage. And some of them even find it. It's just that nothing seems to provide quite the same grip anymore.

A one- or two-year headstart is about the best anyone can hope for these days, according to corporate information systems managers. The pace of technology is shifting too rapidly to allow more than that.

Enron Operating Co. is a prime example of a company that has given itself a lead but must keep running to stay ahead.

A year ago, the Houston-based petrochemical firm, parent company for Transwestern Pipeline, moved to client/server and inaugurated an interactive bulletin board for pipeline customers to use as a sort of commodity exchange in disposing excess capacity.

These innovations in customer service helped Transwestern hold its lead in a competitive market, according to industry analysts. But the majority of pipeline companies are now moving to client/server, so Enron can't count on what it did yesterday to ensure customer loyalty tomorrow. According to Mike Ohannesian, vice president of MIS at Enron, the company is already laboring to give customers even greater access to on-line data and the ability to execute contracts electronically.

That's one of the big catches to competitive advantage today. Because technology keeps advancing so quickly and on so many fronts, systems are outdated almost as soon as they are built.

"We're talking in terms of a year or less for technological changes, which limits the lifespan for competitive advantage based on [information technology]," says George Jones, managing director at the Chicago offices of BSG Consulting, Inc.

NOT MUCH TO CHOOSE FROM

Another tricky aspect of roaming the technological edge in search of new markets and big chunks of share is the fact that much of what's out there is still rough or even partially formed.

Progressive Insurance Corp. in Cleveland is grappling with those hazards as it re-engineers itself, shifting to a new pricing structure, new work methods and — "where appropriate in terms of cost and function" — a new client/server architecture.

Two major goals prompting these changes, says Chief Information Officer Allan Ditchfield, are the ability to target promising new markets better and settle claims faster than other insurers can. Progressive customers, he says, should be able to walk away from a car accident with an insurance check in hand.

While Ditchfield expects to be ahead of competitors by a year and a half or so when the project is completed, Progressive is having trouble finding a robust, client/server transaction-processing system. Ditchfield says the limitations of current technology could limit the advantage the company actually gains.

One comfort for Ditchfield and others who have moved outside the safety of the familiar in search

> “IT’S REMARKABLE HOW MANY PEOPLE BUY THE VENDOR LINE THAT ‘IF YOU JUST BUY [OUR] CLIENT/SERVER, MULTIMEDIA OR WHATEVER, YOU’LL ACHIEVE YOUR DREAMS.’ WE WOULDN’T BUY A CAR ON THAT BASIS.”
>
> JIM MCGEE,
> ERNST & YOUNG

of a bigger market presence for their companies is that the risks involved may cause some competitors to hesitate.

Any company that can’t weather considerable upheaval won’t be able to follow in Progressive’s footsteps, Ditchfield says, because system changes his company is undertaking also demand radical organizational change.

READY FOR RISKS?

It’s possible there is a correlation between sustainability of competitive advantage and the risk-tolerance of a particular industry.

Certainly the hottest hotbeds of competitive one-upmanship right now are industries such as financial services, where risks and high stakes gambles are a way of life.

And what do such investments buy, you ask?

Well, not as much as they used to, it’s true. But for financial services firms, a small improvement can still mean a lot.

“Since they move billions of dollars through their organizations, if they can improve their operations on a percentage basis, that’s a lot of dough,” explains David Frankel, director at Smaby Group, Inc., a Minneapolis-based market research firm. •

Mid-Atlantic correspondent Thomas Hoffman contributed to this story.

Whole lotta guesswork goin’ on

Decision-assist technologies have never quite lived up to expectations, but there’s still hope

BY ELLIS BOOKER

A LITTLE INFORMATION USED TO GO A long way. But that was before delayering, decentralization and the flattened organization. Now decision-support systems — and their upper-management offspring, executive information systems (EIS) — are trying to catch up with a demand for instant data-as-you-like-it that far outstrips their current capabilities.

The need for automated tools to navigate through piles of data and statistics has arguably never been greater. Companies are routinely collecting dizzying amounts of internal and external data and simultaneously trying to put more actionable information into the hands of more employees.

Most decision-support tools aren’t up to that kind of heavy-duty use. Deemed inflexible and requiring excessive maintenance and tweaking, traditional decision-support applications are not what most would call an ideal tool for general data access.

Many decision-support systems have been made more approachable with the addition of graphical interfaces, but under that cover is usually a system built to handle a narrow band of routine queries. Fast-changing requirements and improvisational users were not in the design plans.

INTELLIGENCE A MUST

Because flexibility and adaptability are so critical, many observers are convinced that the next phase in decision-support systems will be the addition of intelligent software “agents.”

If they work as advertised, agents will monitor complex transactions, processes and databases, all the while keeping track of the preferences and behaviors of their human users.

For example, a product released earlier this year by Comshare, Inc. uses agents to notify users of exceptions and to guide them to the source of the problem. “If sales are down in Western Europe in one product line, the agent brings them to that set of data and screens,” says Clare Gillan, director of information access at market research firm International Data Corp.

Other important developments on the horizon for decision support involve massively parallel processing (MPP) systems for quickly sifting through databases, and visualization techniques for comprehending multivariable, dynamic data sets.

Until now, MPP and visualization have been largely the province of scientific/technical computing. The hope, however, is that open system-based MPP platforms, running commercial relational databases from the likes of Oracle Corp., will make it feasible for many more end users to tap the power of MPP to examine large stores of data. Visualization systems may prove the best way to “see” these complex data sets, which often have several dimensions.

A handful of retailers, consumer packaged goods companies, credit-card companies and Wall Street firms have been kicking the tires on these decision-support systems. Most have been reluctant to share the details of their investigations, but American Express Travel Related Services Co. recently revealed that it was testing an MPP application, dubbed Quantum, for sifting through its large customer database. •

GONE, BUT NOT FORGOTTEN

R.I.P. 1993

BIG IDEAS AND ‘LANDMARK’ PROJECTS THAT SANK LIKE STONES

Years of major transition, such as 1993, inevitably take a toll on technologies, projects and architectures that can’t keep up or don’t pay off. Here are a few of the more notable failures, retreats and reversals of 1993:

KITCHEN SINK ARCHITECTURES: DOWN THE DRAIN

DIGITAL’S NETWORK APPLICATIONS SUPPORT (NAS): The VAX-based architecture was supposed to provide a variety of client systems with access to various network services and resources. Digital quietly refocused on integrating heterogeneous client/server systems, including Novell, Inc. and Microsoft Corp. products, through its Pathworks family.

IBM’S SYSTEMS APPLICATION ARCHITECTURE: This NAS equivalent was supposed to provide consistent software and networking environments across IBM’s mainframe, midrange and PC platforms. Now IBM is focusing on integrating customers’ mixed-system client/server and networking installations through Blueprint, a multilayered software architecture introduced in 1992.

USER PROJECT REVERSALS

DHL AIRWAYS’ NATIONWIDE IBM RS/6000-BASED CLIENT/SERVER SYSTEM: The company has apparently abandoned, or at least radically cut back, its plans for a rollout across the U.S. division of DHL Worldwide Express. Michael Lanier, who was hired as CIO to re-engineer DHL Airways’ computing strategy and information systems department, left in 1993, he said, because of the pullback.

THE POSTAL SERVICE’S POSTAL BUDDY: The Postal Service yanked the plug on the user-friendly, PC-based talking kiosk that processed change of address forms and dispensed stamps and other items at 183 post offices, supermarkets and shopping centers around the country. The Postal Service claims that the Buddy did not generate enough revenue, but some sources say politics killed it.

AMR’S CONFIRM RESERVATION PROJECT: This project is now in a Dallas courtroom in shambles. Once AMR’s grand vision to provide a common reservation system to the hotel and rental car industries, Confirm deteriorated into $125 million finger-pointing battle, complete with charges that AMR covered up problems. Former AMR partners Marriott Corp., Hilton Hotels Corp. and Budget Rent A Car, Inc. are trying to recover costs and any usable code. The three have had to make alternative plans for their reservation system future.

WOULD-BE STANDARDS THAT DIDN’T MAKE THE GRADE

ADVANCED PEER-TO-PEER INTERNETWORKING: Proposed by Cisco Systems, Inc. a year ago as a “more open” alternative to IBM’s Advanced Peer-to-Peer Networking, this protocol was officially abandoned in August. The router vendor is now pushing another protocol that, like APPI, routes SNA over a TCP/IP backbone: IBM’s Data Link Switching protocol.

OPEN SYSTEMS INTERCONNECT (OSI): Until this year, OSI had at least two champions left. IBM and Digital Equipment Corp., at one time one-upping each other on OSI-based “openness,” continue to support it but have clearly accepted the reality: TCP/IP is the internetworking protocol of choice for most users.

— ELISABETH HORWITT

ILLUSTRATION: TOM MATTSON

WHY THE NEW WYSE X-TERMINAL

Only five X-Terminals meet the most stringent demands imposed by Wyse. Choose anything less and you just might end up with a bunch of ex-terminals.

WX-17M. 17" monochrome X-Terminal. 1280 X 1024 resolution. MIPS R3000A Architecture at 25 Mhz.

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WX-19C. 19" color X-Terminal. 1280 X 1024 resolution. MIPS R3000A Architecture at 40 Mhz.

WX-19M. 19" monochrome X-Terminal. 1280 X 1024 resolution. MIPS R3000A Architecture at 25 Mhz.

WX-15C. 15" color X-Terminal. 1024 X 768 resolution. MIPS R3000A Architecture at 40 Mhz.

INTRODUCING A LARGE FAMILY IN THE NEW X-GENERATION—THREE COLOR, TWO MONOCHROME.

Wyse brings to the X-Terminal world a wide array of color and monochrome displays, ranging from 15- to 19-inch screens. They feature 256 colors and high resolution for sharp, clear images.

Furthermore, Wyse X-products are upgradable and flexible. They offer dual PCMCIA (PC-CARD) interfaces. And they're ready to accept add-on devices such as Flash Memory cards and DRAM, with future expansion for wireless LAN and modem adaptors.

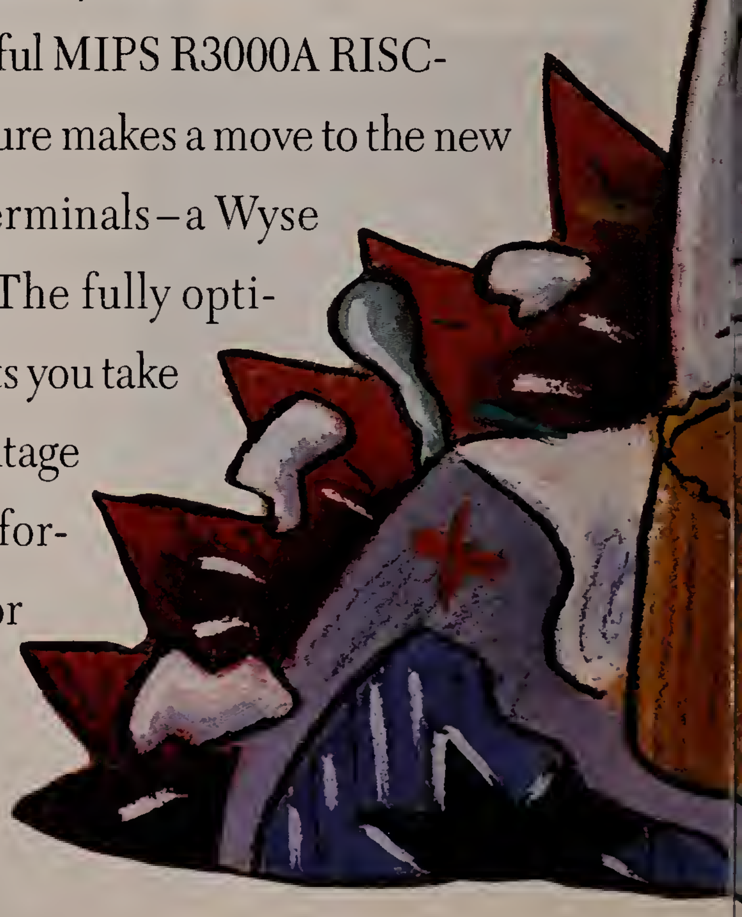
100,000 XSTONES AT ROCK-BOTTOM PRICING.

Ideally, you should be able to add seats in a workstation environment at a reasonable cost, without sacrificing productivity.

With Wyse you can do just that. Compatibility with Sun, DEC, SCO ODT, HP, IBM RS/6000 and other standard UNIX platforms is assured. Fast text and graphics operations are provided by more than 100,000 XStones of performance.

RISC, NOT RISK.

The powerful MIPS R3000A RISC-based architecture makes a move to the new WX series of terminals—a Wyse move indeed. The fully optimized server lets you take complete advantage of the high performance processor for X-specific applications.



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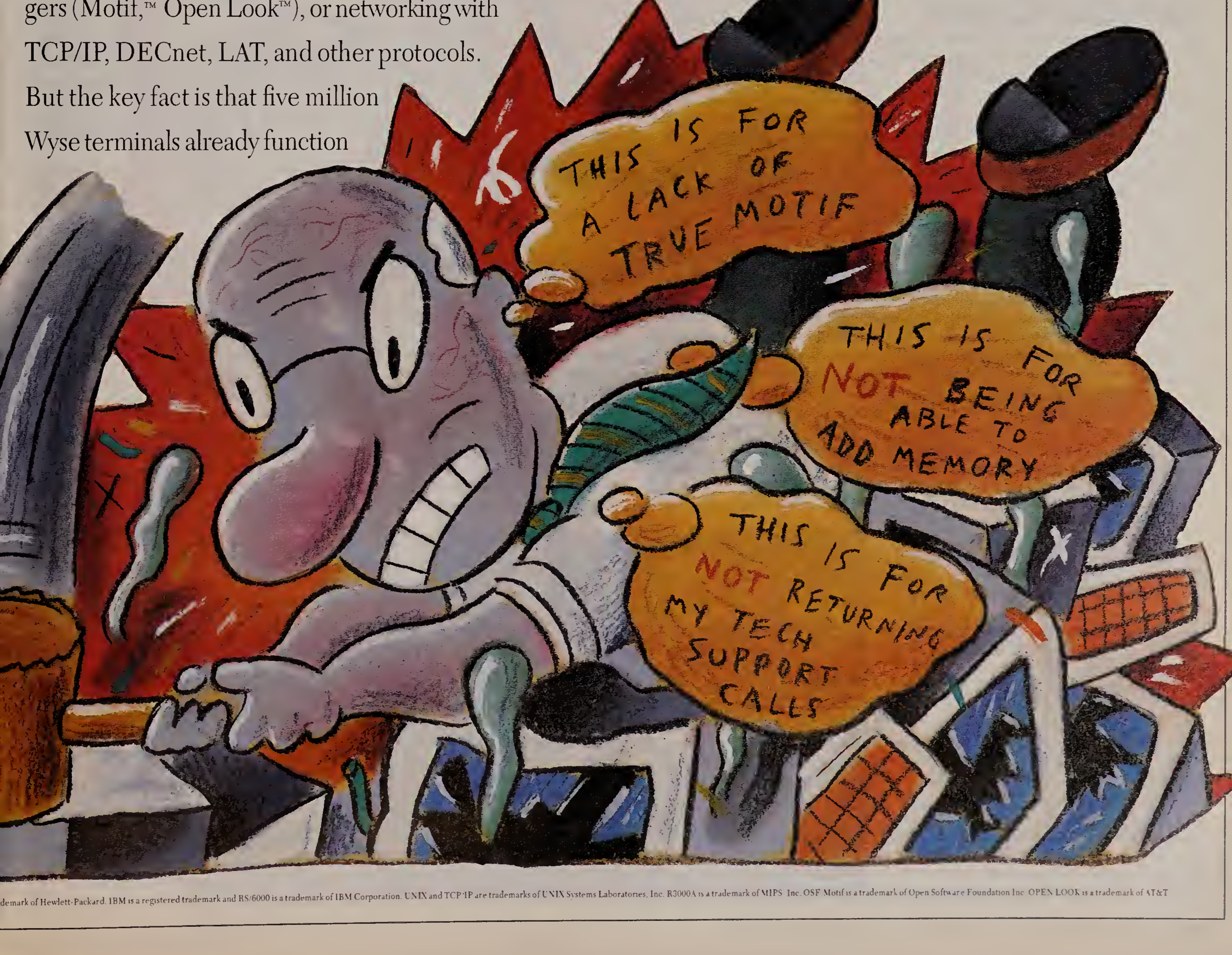
s WON'T BECOME EX-TERMINALS.

And the easy-to-use software allows you to access all your local clients with a simple keystroke.

FIVE MILLION MORE REASONS W SHOULD COME BEFORE X.

Sure, we could list a few dozen other features here. Like local client support with window managers (Motif,™ Open Look™), or networking with TCP/IP, DECnet, LAT, and other protocols. But the key fact is that five million Wyse terminals already function reliably in the business world. Which makes it a sure bet that the new WX line will be hard at work long after others have become X-tinct. Call 1-800-GET-WYSE for details on the new family of X-Terminals from Wyse.

WYSE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THIS IS FOR NOT BEING ABLE TO ADD MEMORY
THIS IS FOR NOT RETURNING MY TECH SUPPORT CALLS

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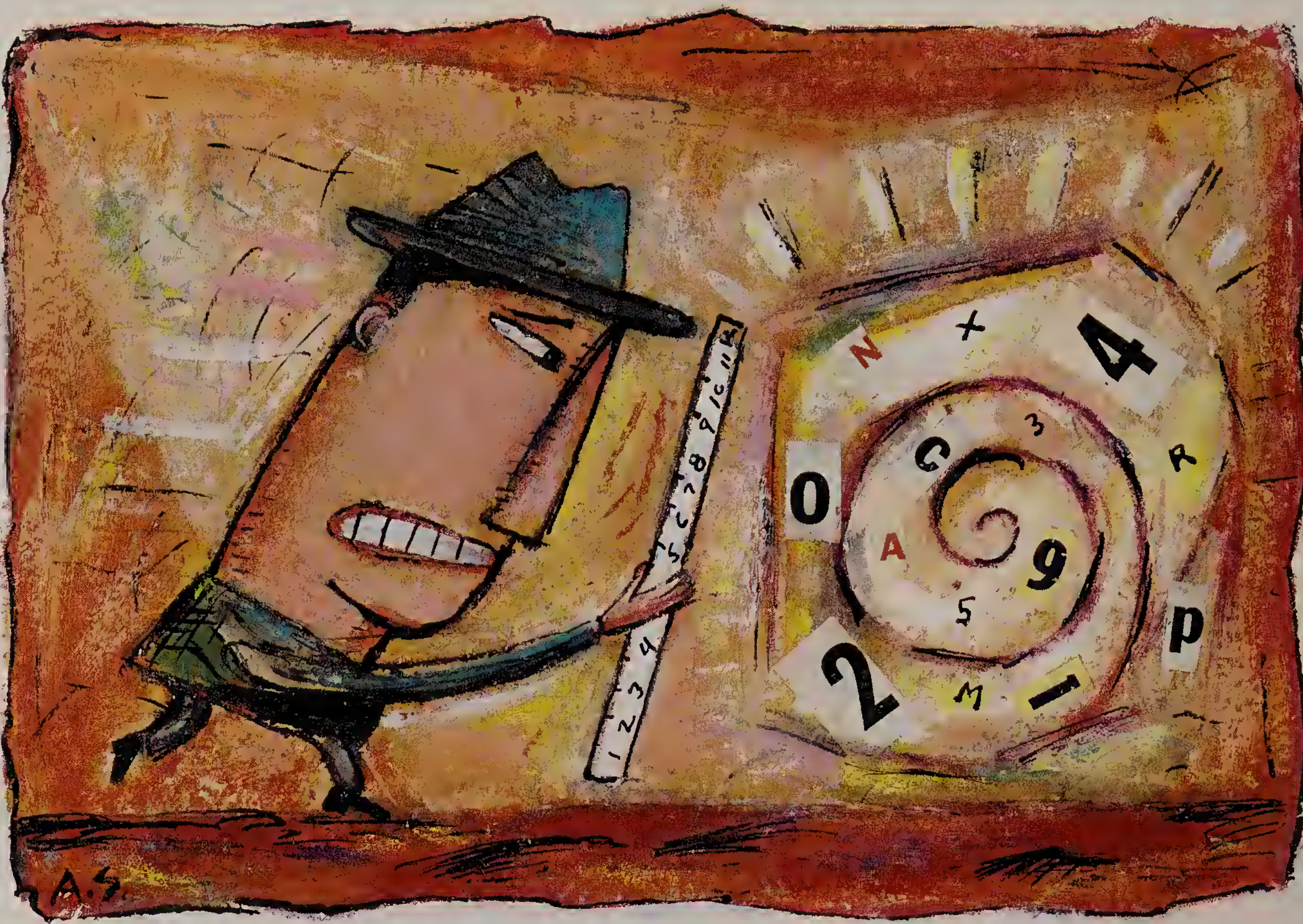
The productivity chase

Proof that technology pays off remains elusive

BY **GARRY RAY**



IN THE LATE 1980S, A CIRCLE OF academics and business economists decided to investigate the connection between productivity and information technology. What they found rocked the industry and shook confidence in information systems. Despite decades of claims that new technology has improved business efficiency, they proclaimed, there was no evidence that it had any significant positive impact on productivity.

Although some economists have lately decided that productivity is again on the upswing, the original studies touched a raw nerve in the corporate suite. Some of the ire remains even today. "Most CEOs and CFOs are extremely unhappy" with the productivity gains from technology, says Mack Hanan, chief executive of The Greymatter Group, Inc., a New York business management consultancy.

Is that unhappiness justified? Have IS managers really missed the mark? Well, yes, in some instances they have.

"There are inept ways of implementing technology, where in essence you speed up the mess," says Jim McGee, a fellow at Ernst & Young's Center for Information Technology and Strategy in Boston. In fact, McGee says, there are more wrong ways to approach computerization than right ones, and for every company that gets it right and achieves productivity improvement, he estimates there are seven or eight that do not.

But there's something else going on here, too. It has to do with the various ways in which productivity can be defined.

In the classic sense, an employee is more productive when he produces more widgets using the same amount of raw material. Then there's the more negative version, which says productivity is producing the same or greater output with fewer employees. (Witness the rosier productivity picture reported by economists in the wake of several years of massive layoffs and restructurings.)

Some observers say mechanistic productivity measurement — based on input/output volumes — is irrelevant to information technology. "The whole system for measuring productivity is built around moving pig iron," says Michael Rothschild, president of the Bionomics Institute in San Rafael, Calif. "How do you measure the productivity increases from fax machines?"

It isn't just that information systems dwell outside the area of standard measures. They alter the processes they touch in ways that may make traditional definitions of productivity obsolete.

"At some point, a new system actually redefines the business process, which means you are changing the rules of the game," says Greg Klein, MIS manager at Sara Lee Personal Products Trading in Winston Salem, N.C. "When that happens, going back to try to measure productivity gain is moot."

So is there any provable connection between information technology investment and productivity improvement? Essentially, that's a big maybe. Few doubt there's a connection or that information technology has some effect: It's isolating and measuring the effect that's hard. And business process re-engineering, which many experts maintain will result in a whole new realm of productivity improvement, may just complicate things further.

As McGee points out, when you reinvent a process or a whole business, you interrupt the continuity that makes aggregate measurement possible. "The more successful you are, the more problems you are going to have trying to measure it," he says. ●

BOGUS WISDOM

?! THERE'S NO HOPE OF EVER MEASURING HOW TECHNOLOGY IMPACTS PRODUCTIVITY.

Don't give up quite yet. Some people, like Darrell Balmer of the Gartner Group, have a lot of faith in something called activity-based accounting, which looks at what it costs from year to year to accomplish a well-defined process — ship 100 items, handle one customer complaint, etc.

?! THE RIGHT STANDARD OF MEASURE WILL AUTOMATICALLY SHOW THE PRODUCTIVITY GAIN.

Wrong, says Morgan Stanley economist Stephen Roach. The problem is not one of measurement, but of recklessness. "Many companies were convinced from Day One that technology was the answer to all kinds of problems and recklessly added a whole new layer of costs to a fixed-cost environment."

ILLUSTRATION: ANDREW SHACHAT

THE 'SEAMLESS' SCAM

Interoperability? HA!

"Interoperability has never been this good, but it's not as good as people dreamed it would be," says Roy Schulte, a vice president of Gartner Group, Inc.'s Software Management Strategies Group.

BY LYNDA RADOSEVICH

Descriptions such as "plug-and-play," "open" and "standards-based" pepper marketing literature for items ranging from desktop hardware to host-based software. But information systems managers say no matter what labels are attached, getting different vendors' products to work together requires intricate stitchery.

Good, but not good enough

FOR GOLDEN CAT CORP., THE MOVE TO PC networks roughly a year ago was hampered by a mysterious malady.

The South Bend, Ind., producer of cat box filler wanted to run a Token Ring network using Proteon, Inc. adapters, Novell, Inc.'s NetWare and Windows-based PCs to access data on the IBM AS/400 midrange host. Software from IBM was to provide the gateway service between the AS/400 and the PC network. But when users tried to connect to the AS/400, the network crashed in five minutes.

After two months, a systems analyst replaced a Proteon adapter with an older IBM card, and "performance improved a thousand times," says Thomas Palmer, vice president of IS.

Still, it was a breakthrough only in identifying the problem, not a solution.

The systems integrator got the Proteon cards to work by replacing the NetWare Open Datalink Interface (ODI) drivers with IPX drivers.

But Palmer says he wants to move to Novell's ODI drivers because that device driver standard is necessary to allow users to run multiple protocols on the same network adapter card without rebooting.

According to Palmer, Proteon promised to work on the problem in July, but he hasn't heard back from them.

"One of the most frustrating things is that I keep telling my staff that we can't be the only AS/400 site that's been though this, but there's not a lot of information that is easily accessible," he says. ●

E-mail off schedule

AT THE COLLEGE OF BUSINESS AT Oregon State University in Corvallis, electronic mail is a way of life.

So in August, when the Microsoft Corp. gateway software that translates messages between the business school and the campus Internet stopped working, computing services manager Greg Scott had his hands full.

GOLDEN CAT'S THOMAS PALMER wants the ability to run multiple protocols on the same network adapter, but he can't seem to get it.

"What do I tell the dean when his mail doesn't reach the provost — 'Sorry, Dean, the gateway was down,'" he asks?

Scott installed an updated version of Microsoft's Simple Mail Transport Protocol (Internet's messaging protocol) gateway software but still couldn't get proper interoperability.

"Sending messages out worked all right, but when the gateway received messages, the IP connection got lost and the gateway became inoperative," Scott says.

To fix the problem, Scott first talked to Microsoft technical support people, but their technical ability didn't stretch to the level of bugs and faulty architecture.

During the next eight weeks, Scott and his staff spent 300 hours working on the problem. Scott moved the gateway machine from the downstairs computer room to his office, 10 feet away from his desk, "so I could really keep my eye on it."

Finally, Scott and his staff worked out a temporary solution by setting the gateway to reboot every six hours. However, that causes mail delivery delays.

"For years I would listen to people moaning about their gateway services and I would snicker," Scott says. "Now I'm in a bind. But there are so many variables that it's not clear what causes the problem, and it's not productive to get into finger-pointing." ●

Between the lab and the real world

THE NATURE OF CHARLES STALLINGS' job as senior communications engineer at MCI Communications Corp. in Colorado Springs is to get "everything in the telecommunications network to work with everything," he says. That's a tall order even for a company that specializes in such things.

For instance, MCI moved a high-speed Fiber Distributed Data Interface network over copper cabling from pilot to production last year after investing "blood, sweat and tears" to get the cabling, adapters and workstations to cooperate with one another.

However, once in production, problems cropped up that hadn't occurred in the lab. Cable length runs of 330 feet worked fine in the lab, but shorter runs didn't work in production. Workstations that worked with the cabling during tests did not work in real use, Stallings reports.

The only way to fix the problems is to "tweak" the various components into compatibility, Stallings says.

There's relief on the horizon, however. Stallings is confident that vendor alliances such as the one announced in August among Compaq Computer Corp., cabling supplier ITT Datacom and LAN vendor SysKonnect, Inc. can help because they guarantee compatibility. ●

KNOW YOUR VENDOR-SPEAK

BY JEAN S. BOZMAN

Users say they sometimes get the strong impression that glowing vendor descriptions in glossy product brochures may be a bit overstated — or misleading. (Yes, really!) Occasionally, they wish they could get on-the-spot interpretation of what the vendors actually meant to say. At right is a quick reference guide for the open systems shopper.

WHEN THEY SAY THIS:	THEY REALLY MEAN THIS:
▶ "Provides interoperability among standard computing platforms."	▶ "We'll do Windows and Unix first, and you can hold your breath waiting for the OS/2 and Macintosh versions."
▶ "We have powerful and cost-effective servers."	▶ "We finally reduced our outrageous prices."
▶ "Our customers have the benefit of scalability."	▶ "Watch as we try to sell you bigger and bigger machines."
▶ "We deliver support for industry-standard application programming interfaces."	▶ "We couldn't figure out any other way to make this product operate with any other vendor's product."
▶ "Our product improves resource usage, response times and availability and also maintains service levels."	▶ "We simply ran out of sensible things to say."
▶ "You can deploy our objects in a heterogeneous environment."	▶ "After you've paid us, good luck ever finding them again!"

PHOTOGRAPHY: MICHAEL ABRAMSON

APPLICATION DEVELOPMENT

Still backlogged after all these years

Make a dent and demand goes up

BY **MELINDA-CAROL BALLOU** AND **DEREK SLATER**

With so many spiffy new development tools hitting the market in the past few years, many information systems managers dared to hope the application backlog—that long queue of software projects awaiting attention—would be a thing of the past by now.

It hasn't quite worked out that way . . . yet. Some IS executives say they are making progress, but others say they are falling further behind.

"Our latest research shows the backlog continuing to increase because the complexity of the business has increased so significantly," says David Sharon, president of CASE Associates, Inc., a consulting firm in Oregon City, Ore.

Our own research is slightly more optimistic, but only slightly. Of 101 IS executives polled by *Computerworld*, 37% said their application backlogs have decreased during the past three years. However, an offsetting 34% reported that the pile of undeveloped applications has grown.

Burroughs Wellcome Co. illustrates some of the most common obstacles to taming the backlog monster—unremitting user demands and the time it takes to become fully fluent in the new development tools. The company is five years into the development of an enterprisewide clinical-trial monitoring system and hasn't been able to make a dent in its backlog despite new tools such as Powersoft Corp.'s PowerBuilder software.

"Eventually we hope to cut down the backlog with these tools, but we're too new in the arena to have made a dent," says project leader Greg Corbin. "We're approaching a huge learning curve." Since Corbin's team began work on the clinical-trial monitoring system, they have placed all other application requests on the back burner.

While IS is wrestling with complex strategic projects, application requests continue to flow in. More than 75% of the IS execs surveyed by *Computerworld* said departments are asking for new applications more than ever.

Even fix-it-up projects aren't simple anymore, Sharon says. When end users ask for changes to existing systems, they aren't talking about adding a new feature. "The requests are for major overhauls of core programs as the company changes policies and manages acquisitions and mergers," he says.

Another problem, some users say, is that tools such as PowerBuilder and Gupta Corp.'s SQL Windows, while helpful, lack the muscle for developing high-end applications. Key missing features are configuration management and front-end design capabilities, though vendors are scurrying to link up with computer-aided software engineering tools to provide those functions.

BANKERS TRUST'S GLENN SHIMAMOTO says choosing architectures to standardize on has had a big impact on his organization

PROGRESS MAKES PERFECT

Still, many users are making progress thanks less to application development tools than to do-it-yourself aids such as PC report writers and organizational/procedural reforms.

PC report writers, which allow the handing off of routine tasks such as query creation to end users, have been a real boon for some organizations, freeing programmers to concentrate on more complex applications.

Standardizing development techniques can also speed development. Establishing preferred technical architectures—standard choices for database managers, communication protocols, server configurations, etc.—has made a significant difference at Bankers Trust Co. in New York, according to Glenn Shimamoto, a vice president there.

"A lot of things were loosey-goosey. Firming that up means that individual project teams don't have to worry about architectural issues and can assume a template of some sort," Shimamoto says. •

BOGUS WISDOM

?! ADEQUATE TOOLS ALREADY EXIST FOR DEVELOPING ENTERPRISEWIDE DISTRIBUTED APPLICATIONS.

Think again. Current graphical user interface-based tools work just fine for low-end, decision-support-type applications, but there's a lot still missing when it comes to development of complex, mission-critical client/server applications.

Many vendors are trying to beef up their tools and/or provide gateways to existing products such as Intersolv, Inc.'s PVCS configuration and version control tools to target higher-end development. But some analysts say industrial-strength client/server tools must be designed from the ground up to be effective.

CW SURVEY

STATE OF THE BACKLOG

70% of those surveyed say their backlog is a year or less

BUT

56% either haven't made a dent during the past three years or have seen the backlog increase

AND

32% say application development is claiming more of the staffing budget

EVEN THOUGH

67% report an increase in development productivity.

PHOTOGRAPHY BRIAN SMALE

Computerworld Index

GENERATION GULF

Percent of adults ill at ease using a computer: 23%

Percent of teens: 7%

Source: Dell Computer Corp.

IF AT FIRST YOU DO SUCCEED . . .

No. of days it took Next to sell 50,000 machines: 2,920

No. of days it takes Apple to sell the same amount: 6

Source: Steve Jobs and the NeXT Big Thing (Atheneum, 1993)

YOU GET WHAT YOU PAY FOR

Average daily salary for a trade show model: $250

Average daily salary for a senior systems analyst: $180

Sources: Marie Smith Agency; CW Salary Survey

AGONY OF DE FEET

No. of miles on the Comdex/Fall trade show floor: 22

No. of miles of road at Disneyworld: 160

Sources: The Interface Group; The Walt Disney Co.

DOWN AND OUT

No. of species on the worldwide endangered species list: 1,200

No. of employees released from IBM in 1993: 34,000

Sources: Department of the Interior U.S. Fish and Wildlife Service; IBM

NATIONAL TREASURES

Estimated worth of Bill Gates: $6.16 billion

GNP of the nation of Iceland: $5.8 billion

Sources: Forbes magazine; The World Bank

KNOWLEDGE BY THE POUND

Average weight of a 1994 notebook computer: 6 pounds

Average weight of the adult human brain: 3 pounds

Sources: BIS Strategic Decisions; 1993 Worldbook Encyclopedia

HOT	NOT
The Internet Everybody wants access	**Prodigy** Not profitable; backed away from flat-rate pricing
Subnotebooks Small, portable, powerful	**Laptop PCs** A retro commodity
Microsoft bashing Everyone does it	**IBM bashing** Why kick an icon when it's down?
Product suites All-In-1 at a better price	**Stand-alone PC apps** Prices plunging and integration's the thing
Frame relay It's here	**ATM** A lot of PR fanfare
Re-engineering — before you do it Theory is great	**Re-engineering — after you do it** Hidden costs, disgruntled staff
AT&T See, phones and pictures *can* work together	**AT&T** Bureaucracy with a little frosting
Direct database connections Difficult but worth it	**ODBC** Users give up too much functionality, performance and stability

Simply hot, hot, hot

Multimedia
This is (finally) the year.

Object-oriented programming
The introduction of a slew of tools in '94 will make this fast out of the blocks. Reuse is a perfect hook for frugal times.

Parallel processing
Links to client/server tools and surge of interest in pattern identification resurrect this battered product category.

PowerPC
With the Apple/IBM/Motorola power behind it, will give other RISC chips a run for their money.

Simply not, not, not

PDAs
Poised to Disappoint All. We'll have to wait till '95 for production-mode products.

Pen-based computing
They still can't read what you write.

Cyber or virtual anything
Hollywood may love this stuff, but it projects on a screen better than it plays.

ISDN
It's Still a Dead Network.

Convergence of TVs, computers
The amount of debt piled on cable companies and the fundamental difference between the TV user and the computer user will work against this area.

Sources: CW staff; Tom Nolle, CIMI Corp.; N. Dean Meyer, NDMA, Inc.; George F. Colony, Forrester Research, Inc.; Richard Finklestein, Performance Computing, Inc.; Fast LAN technology

WHAT I'M READING

Michael Hammer, President, Hammer & Co.

• *Things That Make Us Smart* by Donald A. Norman (Addison-Wesley, 1993). "Don Norman is a cognitive scientist who understands people, machines and how they relate. His works are essential for anyone who will ever design a user interface."

• *Bureaucracy* by James Q. Wilson (Basic Books, 1989). "While focused explicitly on governmental agencies, this book offers profound insight into how all large organizations take on lives of their own."

Gordon Bell, member of various boards, consultant and inventor of Digital Equipment Corp.'s VAX

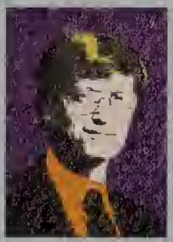
• *Game Over: How Nintendo Zapped an American Industry, Captured Your Dollars and Enslaved Your Children* by David Sheff (Random House, 1993). "Nintendo has one of the largest installed bases of any computer, so it's an important system to understand. What happened with that machine may have relevance to other systems."

Philippe Kahn, CEO, Borland International, Inc.

• *The Virtual Corporation* by William Davidow and Michael S. Malone (Harper-Business, 1992). "It's a new way to think of partnerships and helps you get maximum benefit to customers while minimizing management headaches."

• *Anecdotes in Modern Art* by Donald Hall and Pat Corrington Wykes (Oxford University Press, 1990). "It's an incredible peek into the universe of some of the most creative people who ever lived — from Rousseau to Warhol. Fascinating and humbling!"

Bill Gates, Chairman, Microsoft Corp.



• *The Intelligent Investor* by Benjamin Graham (Harper & Row, 1985). "Businessman and philanthropist Warren Buffet recommended it as a good book for understanding the market." [Ed note: Buffet, worth $8 billion, was No. 1 on *Forbes'* 1993 list of the 400 richest Americans. Gates was No. 2.]

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SORRY I'M LATE–I STOPPED AT COMDEX IN NOVEMBER AND GOT CAUGHT IN A CAB LINE.
1994
Computerworld

Notes report misread ROI conclusions

Your article "Notes goes mainstream" [CW, Dec. 13] caught us somewhat by surprise.

It reported the preliminary results of a return on investment study we are undertaking on Lotus Notes users worldwide. We appreciate the interest in our study but in the rush to bring timely news to your audience, we believe *Computerworld* displayed symptoms of the CNN disease — in the rush to get news out every flash in the sky becomes a SCUD kill.

This is not to say there was no value to your Notes article, but two erroneous statements serve to undermine the effectiveness of your story and unfortunately our study.

I was quoted as claiming that, despite the long lead times to recoup the investment, corporate buyers are still lining up to buy Notes. That was derived from your caption above our return on investment chart depicting the preliminary results of the study. Your caption read, "A survey of 70 companies that have worked with Notes for one to three years found most sites still waiting for their investment to pay off."

You are talking about *payback* while the chart clearly says *return on investment*. As a result, you have mixed up two entirely different financial measures and drew an erroneous conclusion.

The truth is, I did say, "small and large companies alike obtain the same financial benefit of Notes, clearly demonstrating that this is not simply a technology for large companies."

On the financial results aspect of the story, our return on investment results are averaging at 50% or better to date, which means no one is waiting for the benefits to begin.

Once the study is completed in January, we will be happy to work with *Computerworld* to bring your readers the story behind the financial implementation of Notes.

Scott C. McCready
Principal
International Data Corp./Avante
Framingham, Mass.

Client/server preferred

In "Don't be so quick to rip the mainframe!" [CW, Nov. 29] Joe Vincent stated the costs of applications on LANs are 1.5 to 2.8 times higher than on mainframes.

This form of analysis leaves out vital details. That the cost differential is so low, so early on the learning curve, is a testament to the relative ease of client/server development. And graphical user interfaces are a proven method of reducing user training and support, but their added functionality can increase the development effort, especially early in the development learning curve.

IMS America has just gone into production with a Hewlett-Packard RISC clustered processing solution that costs much less than the mainframe it replaces.

The fact that it is managing 1.3T bytes of redundant arrays of inexpensive disks (with more on order) is a testimony to its viability, and the improved responsiveness is an indication of its desirability.

Robert Hill
IMS America
Plymouth Meeting, Pa.

General managers lack data knowledge

Regarding your editorial "It tolls for thee" [CW, Nov. 15], it is evident that we in the business are our own worst enemies.

We exhort data processing people to get to know the business they serve, but we rarely demand that general management learn anything about data processing people or their unique problems.

When things are perceived as going wrong in "computerland," general management hasn't a clue who is really at fault or whether it can be fixed. They look for a scapegoat, and it's not too hard to find one.

Ignorance of technology on the part of the chief information officer is not the problem, as you suggest. Ignorance and unrealistic expectations by general management is.

Earl Gates
Decatur, Ill.

Workplace OS based in reality

I'm surprised at John Gantz's column "Will we ever land in Cairo?" [CW, Nov. 22] about Microsoft's object-oriented operating system, Cairo.

I agree that Cairo will turn out to be shadows and mirrors, but I disagree with Gantz's assertion that IBM's Workplace OS is a Cairo knockoff. That's absurd! The Workplace OS will be an object-oriented operating system built around the Mach Unix microkernel.

Pohl Longsine
Lincoln, Neb.

AIX, HP/UX lead the pack in openness

Your survey on open operating systems, "Who's most open?" [CW, Dec. 6], is very misleading. Why was IBM the only vendor to include both a proprietary and open operating system combined in its rating? Why was AIX not separated from MVS as was done for every other vendor in the survey?

As a result of your combining AIX and MVS operating systems, your survey results lead readers to believe that IBM's AIX is *not* open. This cannot be more untrue.

In D. H. Brown Associates' detailed, objective analysis of the openness of operating systems, IBM's AIX placed in the lead with HP/UX. Following HP and IBM in the third through fifth positions are Sun Solaris 2.2, DEC Ultrix 4.3 and Sun Solaris 1.1

Donna Bleakley
Research analyst
D. H. Brown Associates, Inc.
Port Chester, N.Y.

Object Design, a key object player

"Relational threat stalks object DBMS makers" [CW, Nov. 22] dismisses *all* object database vendors and gives an inaccurate account of Object Design, loosely labeled as the "one possible exception" that is making money.

It's safe to say that Object Design is the company that is vaguely referenced here, since we have established our position as the dominant player in the object database market with 1993 revenue expected to hit the $25 million mark, and have remained profitable over the last four quarters.

In addition, the chart that accompanies the article labeled "On the slow road" is a mystery to me, as I liken 100% growth of a market per year to the autobahn.

Ken Marshall
President and CEO
Object Design
Burlington, Mass.

BEST COMPUTER NEWSPAPER 1992
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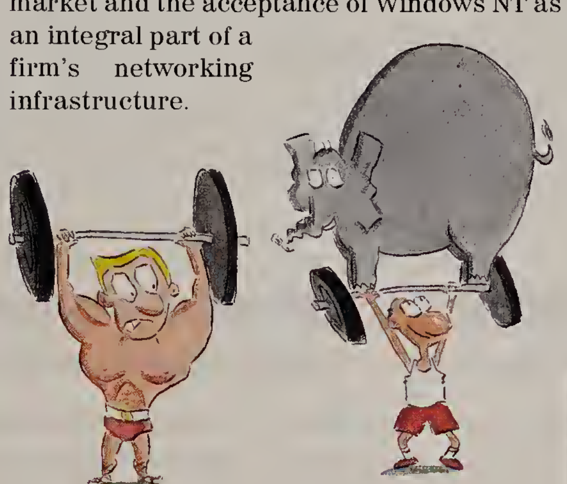
RDBMS a commodity and NT a winner

Patricia B. Seybold

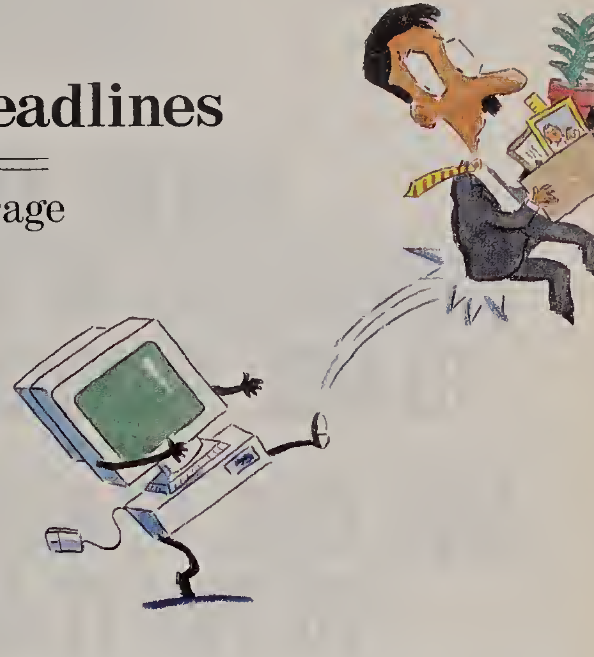
Windows NT becomes the de facto server operating system of choice for most client/server applications. The irresistible pricing and packaging of Windows NT and the SQL Server database management software developed by Sybase and ported by Microsoft to NT make it the platform of choice for client/server pilots in the first half of '94.

For less than $10,000, customers will be able to deploy relational database servers that outperform many of the Unix RDBMS/server combinations costing $100,000. The result is the commoditization of the relational database market and the acceptance of Windows NT as an integral part of a firm's networking infrastructure.



Tomorrow's headlines

Michael Schrage



The nation's largest insurance companies — Aetna, Allstate, Cigna, etc. — announce they will lay off tens of thousands of white-collar workers, at least one-third of their work force, during the next three years. They cite improved information technology systems as the economic justification for the cuts. The announcements prompt congressional hearings into the impact of new technologies on white-collar employment.

The soft dollar crisis of 1994 slashes information systems budgets in dozens of Fortune 500 companies. Those monies are allocated to human resources and general administration instead. Managers in these areas quickly come to understand why IS managers preferred dealing with machines over people.

Companies that bought all their hardware, software and network technologies on the cheap during the last three years now whine that they are receiving inadequate maintenance, support and training from vendors.

A handful of Fortune 100 companies announce they are standardizing on the Internet for their nonmission-critical internal communications and customer/vendor electronic data interchange. They're happy with their encryption infrastructures and predict their telecom bills will decline by 25%. Good luck.

By the end of 1994, Cannavino, Spindler and Kavner are all named to different posts with less power. General Electric announces it would like to make a friendly acquisition of Xerox. Lou Gerstner is quoted as saying, "This turnaround is going to take longer than I had initially expected, but I am confident that we will see tremendous progress in 1995. We will reward the customers who have been loyal to us." GE also offers to buy 25% of IBM.

NEC announces it is buying 20% of Unisys, but says it will be a passive investor.

Bill Gates announces that Microsoft's future is in consumer — not business — markets.

Red herrings and green come-ons

John Gantz

While 1993 was dominated by Windows NT as it made its torturous debut, 1994 will be dominated by its leaner alter ego, Chicago. But I expect Chicago's entrance into the market to be as blustery as its namesake city.

If Cairo is a phantom operating system, as I have suggested in my regular column, then Chicago is a red herring. It will be revealed in 1994 that Chicago was, in fact, developed by the Microsoft Visual Basic team as a way to sell more development tools. In order to develop software for all of Microsoft's Windows application programming interfaces (API), programmers will begin to treat the APIs as assembler language and write using the tool kits, subroutine libraries, etc. Then in 1995, when Microsoft has wrung the last out of the DOS-to-Windows conversion, it will be time to churn the base again.

Other misconceptions will also be cleared up in 1994:

▶ Green PCs will prove about as popular as green beer. Nothing demonstrates the commodity nature of the PC business as the fact that vendors are driven to such lengths to differentiate their products. Wanna save the planet? Drive a golf cart to work.

▶ The phrase "information highway" will be revealed as the antonym of the data networking architecture being stitched together across the globe, even as you read. But since "n-dimensional, hacker-friendly spaghetti" is so unpoetic, we'll use it anyway.

▶ The first evidence will surface that the telephone company megamergers, which are supposed to position them to enter home multimedia markets, will equip them about as well as the mergers and acquisitions of the 1980s did for entering the computer, software, management consulting, real estate investment and PC retailing markets. This time the telcos will be able to lose money on an even grander scale — perhaps trillions, instead of billions.

Imagine no new products

Esther Dyson

Yes, 1994 turned out to be an amazing year. Because of a political showdown with Ross Perot that escalated unpredictability, the Clinton administration outlawed all new technology for one year in a high-publicity attempt to save jobs.

After some bickering over what was new and what was merely "improved," vendors set to work to complete development on their existing products. By mid-1994, most products first shipped in 1993 were bug-free and operational. By year's end, most customers had installed everything they had bought, and systems integrators were figuring out how to get most existing products to interoperate.

Productivity soared, and it was productivity of a painless kind. Instead of laying off people, most customer companies found they had increased sales (by improved quality and customer service) and could redeploy workers.

As we head into 1995 and vendors are free once again to ship new products, debate rages: Does anyone want them?

ILLUSTRATIONS BY MICHAEL MORAN

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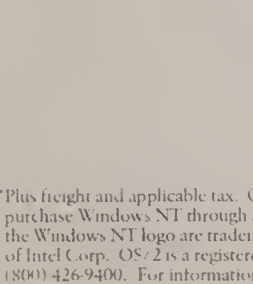

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Forecast '94: Desktop Computing

The way things ought to be

OPINION BY DAVID COURSEY

GEE, I HATE RUSH LIMBAUGH. IT'S NOT *MERELY* that we disagree on almost everything. It's that I'm convinced Rush is far more interested in lining his pockets than in seeing his vision actually come to fruition.

Still, you have to give the guy credit. At least he's out there saying something. And if one good idea takes root, perhaps it is OK after all. So, it's in that spirit — this column does little to line my pockets — that I'm stealing the title of Rush's book to offer my own list of modest proposals for the new year. And you have my unconditional guarantee: I would be thrilled if all my suggestions were implemented, though I will continue breathing normally while I wait.

1. Microsoft needs to admit it's never going to be a local-area networking company and start working with Novell instead of looking so foolish trying to build a LAN operating system over and over again.
2. The Redmondians could also give us a target date for when an object-oriented database and engines for text processing, graphics and mathematics are going to start shipping as part

Coursey, *page 68*

What users demand of 32-bit

Vendor promises fail to convert many users to 32-bit operating systems

By Ed Scannell

■ For years, or so it seems, IBM and Microsoft Corp. have promised users that 32-bit operating systems such as OS/2 and Windows NT would cure cancer, cost a dollar and taste like chocolate. In other words, they would be the panacea that cures all their desktop computing ills.

But so far, many users have remained sick, spending quite a bit more than a dollar for cures that taste more like castor oil. But given what IBM recently delivered and what Microsoft and companies such as Next Computer, Inc. promise to deliver, 1994 may be the year many users get well.

What users are demanding of 32-bit desktop operating systems in 1994 is what they have always wanted: ease of use, speed, scads of applications and a product that doesn't require lots of expensive hardware.

"While they advertise that their stuff [operating systems] is so easy to use, most of these vendors are still making products designed more for power users than for grassroots users," said Mike Drips, a Windows beta user and consultant in Tampa, Fla.

While OS/2's 4 million installed base pales in comparison with Windows 3.0's 40 million, many think the product has turned an important corner.

Sticking with 16-bit systems

"Until some of these guys [IBM and Microsoft] can deliver something for the desktop that doesn't require a mini-Cray to run, I have to stay with my 16-bit hand," said one information systems manager who has beta-tested dozens of IBM and Microsoft operating systems.

If Microsoft delivers Windows 4.0, code-named Chicago, with all of its 32-bit spit and polish and there is a raft of 32-bit applications available, corporate users may finally believe in that 32-bit religion.

Microsoft says it expects to ship 50 million copies of the product in the first 12 months of availability. Given International Data Corp.'s prediction of 40 million PCs to be shipped in 1994 and that Windows 3.1 now ships bundled on almost 70% of all machines worldwide, a few observers said they do not find that prediction so outlandish. However, Chicago's document-centric interface, which Microsoft has only vaguely described to date, may finally evaporate the longstanding user complaint that 32-bit operating systems are too hard for average users to handle.

"People more naturally know what to do with their tried-and-true application to get their job done than with some of the more obscure desktop metaphors they have now," said Dan Spivey, a PC coordinator in Gaithersberg, Md.

Chicago fans

Users also like the modular characteristics of Chicago, which may allow them to use less expensive hardware, as well as the system's plug-and-play aspects — which give them flexibility in customizing hardware combinations.

While IBM has not revealed any plans for significantly changing OS/2's interface this year, one IBM executive said the company will alter its file system, making it easier for less experienced users to get at the system's 32-bit power.

While IBM says users can get some use out of OS/2 with 4M bytes of memory, to do productive work still requires 8M bytes. The long-promised 4M-byte version of the operating system still appears as far away as it did a year ago.

What may haunt OS/2 throughout the next year is the failure of Top 10 developers to provide applications that are written specifically to take advantage of OS/2's 32-bit properties.

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Microprocessing

Apple PowerPC takes on Intel

By James Daly

Ten years after Apple Computer, Inc. took on IBM for dominance of the PC industry with the introduction of the Macintosh, the company is once again spoiling for a fight.

This time Apple has chosen an equally formidable foe — Intel Corp. — and in an ironic twist has teamed with former archenemy IBM to do the job.

At this week's Macworld Exposition, Apple is expected to show Macintoshes based on the PowerPC microprocessor, the chip forged by the alliance of Apple, IBM and Motorola, Inc. The PowerPC-based Macintoshes will not be announced or available until March, but the transition to the PowerPC is a critically important one for the Macintosh architecture.

"Apple has put all its chips on the table with PowerPC," said Doug Kass, an analyst at The Viewpoint Group in Santa Cruz, Calif.

Apple is literally betting its future on PowerPC. Within two years, Apple will produce nothing but PowerPC-based Macintoshes because "the old architecture has simply run out of gas," said Chief Executive Officer Michael Spindler.

The PowerPC Macintosh

What's in store

MODEL	CONTRIBUTION	AVAILABLE
POWERPC 601	Will be used in initial midrange and high-end Macintosh systems.	March 1994
POWERPC 603	Designed for the high-volume desktop Macintoshes, as well as portable PowerBook and Duo models. Also suited for embedded controller applications. Offers performance similar to the 601 in a lower-power, lower-cost design.	Mid-1994
POWERPC 604	Will eventually replace the 601, allowing for better performance in midrange and high-end Macintoshes.	Late 1994
POWERPC 620	Intended for high-end products offering premium performance and a full 64-bit architecture. Designed primarily for high-performance workstations and servers.	Mid- to late 1995

It's now or never

Some analysts said it is the last chance for true competition in the microprocessor market. The computing world essentially belongs to Intel and Microsoft Corp. Tens of millions of computers using Intel's 80386, I486 and Pentium chips are already in use, and businesses have invested billions of dollars in software linked to those chips. Microsoft is selling an estimated 1.5 million copies of Windows each month, most going out the door with an Intel-based computer.

With increasingly large applications gobbling up precious computational resources on all platforms, Apple will market the PowerPC as a speed demon. PowerPC Macintoshes running at 66 and 80 MHz will run Macintosh applications at about the speed of today's high-end systems, but applications written natively for PowerPC will run two to four times faster, said Apple spokeswoman Betty Taylor.

Analysts say Apple will ship as many as 600,000 PowerPC-based machines in 1994.

Apple has a strong ally in IBM, which has also shown systems using the new chip and said it will use the PowerPC chip in mainframes and laptops as well as desktop and workstation systems. Apple officials said such a commitment could have a peripheral benefit for the Macintosh as well.

Another plus for the PowerPC chip is that it

Apple, *page 69*

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Mobile computing

Digital assistants to come of age in 1994

By Michael Fitzgerald

Users and vendors will look at personal digital assistants (PDA) through a magnifying glass in 1994, trying to see just what these devices might offer. It may be a while before they see much, however, as certain key PDA developments will not take place until late in the year.

PDAs in 1994 will be "almost like when creatures first came out of the water onto the land," said Jeffrey Henning, an analyst at BIS Strategic Decisions in Norwell, Mass. "A whole lot of things were spawned, and the question was who would survive."

Open communications

PDAs have the potential to allow users to easily swap data from one system to another, including synchronizing personal contact files. They could also allow remote access to desktop files and electronic mail during meetings and more immediate communication links.

Henning said he expects to see products from at least 18 vendors come into the market in 1994. Many vendors, such as IBM, Compaq Computer Corp. and Toshiba America Information Systems, Inc., have already announced their plans to enter the PDA market. Some, such as Motorola, Inc. and Sharp Corp., have announced plans to build multiple types of PDAs — Motorola, for instance, will build a wireless handheld around General Magic, Inc.'s Magic Cap operating system, Apple Computer, Inc.'s Newton technology and Microsoft Corp.'s At Work for Handhelds. Then there is the Microsoft/Compaq/Intel Corp./VLSI Corp. Mobile Companion effort, expected to ship its first product in mid- to late 1994.

Meanwhile, current PDA makers, such as Apple and AST Research, Inc./Casio, Inc., will continue to enhance their products.

Despite the potential wait, IS managers said they will watch the developments.

"We're very interested in that whole process because we're trying to get the users closer to the patients, rather than being tied to their desks," said Wayne Robertson, systems administrator at Saint Agnes Medical Center in Fresno, Calif. Robertson said Saint Agnes has 11 buildings spread out over three quarters of a mile, and it would be helpful to give doctors and nurses access to patient information from wherever they are.

Said Michael Stonecipher, office systems manager at United Missouri Bank in Kansas City, "I see some real potential out there for these to have business application, and that's why I'm getting so excited about PDAs."

United Missouri's auditing department just ordered 30 Newtons, after seeing some financial application software it liked, Stonecipher said. United Missouri owns banks in four states, and PDAs might help banking auditors keep in touch and gain access to certain financial information, he said.

Good for what?

Vendors will join users in trying to figure out just what PDAs are good for. While support for E-mail and file transfer is considered important, "we may find that it's probably more important to support business-card beaming" than many other features, said Brian Dougherty, chief executive officer of Geoworks, Inc., which has a PDA operating system used by AST and Casio, among others.

Whatever happens in the next year, some think it will take a while for PDAs to mature into a solid market, just as the PC took time.

"Nobody's going to get rich on these things in the next few years," said Andrew M. Seybold, editor of the "Outlook on Mobile Computing" in Brookdale, Calif.

PDAs

BIS Strategic Decisions projects rapid growth in unit sales for PDAs:

1993:	96,000
1994:	181,000
1995:	364,000
1996:	781,000

Analyst Jeffrey Henning expects products from at least 18 vendors in 1994.

Vertical applications will build on suites

By Michael Vizard

As the PC application industry moves into 1994, information systems managers are likely to notice a subtle shift concerning how vendors will position their applications.

Rather than being simple end-user productivity tools, all four major software vendors — Microsoft Corp., Lotus Development Corp., WordPerfect Corp. and Borland International, Inc. — will tout PC applications as a base for building client/server applications.

More macros

To accomplish that goal, they are adding more robust macro languages to their applications that can be used across multiple packages. In fact, many of these macro languages may be familiar to end users since they are primarily based on derivatives of Basic.

For example, Microsoft is bundling Visual Basic in PC applications, and Lotus plans to bundle LotusScript in its offerings. LotusScript is a derivative of Visual Basic that will run cross-platform and features several object extensions.

Meanwhile, Borland will bundle its own object-oriented scripting language in Borland Office, which consists of its Quattro Pro spreadsheet, Paradox database and WordPerfect's namesake word processor.

Residing underneath these languages will be Version 2.0 of Microsoft's Object Linking and Embedding (OLE) interface for Windows or the OpenDoc specification being created by IBM and Apple Computer, Inc. SQL links will be used to link these suites to various corporate databases.

"What we'll be offering is a standard platform with tools that can be used to build vertical applications," said Jack Armstrong, director of marketing for SmartSuite. However, Armstrong noted that most IS shops will not see these trends start to take shape until vendors have full-blown object implementations around the end of 1994.

Even Microsoft, which is shipping OLE 2.0 support in Microsoft Office 4.0, has not yet fully implemented the OLE 2.0 specification in terms of an automation facility that will make it easy for applications to share objects.

However, once these technologies are deployed, IS managers can expect to spend a lot of time monitoring how they are used. While it may be practical for some end users to build an application for themselves or maybe even their department, the need to maintain quality control is going to require IS managers to maintain strict standards.

Support issues

"A herd of end-user systems creates problems in terms of support," noted Glenn Chafe, a systems manager at National Canadian Railways in Montreal.

At the same time, however, many end users are already building vertical applications on top of PC software, and they cannot wait for IS to build every application they need.

"As an end user who builds applications on top of suites, getting these tools will be fantastic," said Stacy Myers, senior analyst at the South Florida Water Management Project in West Palm Beach, Fla.

Coursey

CONTINUED FROM PAGE 65

of some future operating system. Then we can calibrate our watches for how long the suite craze — or the Big Four horizontal desktop productivity applications themselves (spreadsheet, word processing, database, graphics) — will last.

3. Apple needs to go ahead and give its executives signs reading "Will run business unit for food" and send them onto the streets of Cupertino. If the bigwigs find this thought demeaning, perhaps they will start making more of their products work together in some reasonable fashion. Or decide what businesses the company wants to be in and create something truly interesting. So many good ideas, such poor execution.

4. Customers need to say no. Try telling a few of your vendors that. *No*, you aren't going to commit to their next-generation whizzy gizmos until they make the whizzy gizmos you already have work as promised. Watch them cry.

5. Novell needs to "promote" Ray Noorda to chairman emeritus *today* and hire an outsider as CEO. Then it needs to make Unix the cornerstone of its business and PowerPC the preferred platform.

6. AT&T needs to buy both Apple and Novell as a means of providing adult supervision for a couple of companies that really need it. It would also make AT&T the real challenger to Microsoft's domination of the industry.

7. One measure of the success of the new team at WordPerfect will be how quickly it gets its electronic mail/calendaring/scheduling package — now called WordPerfect Office — renamed. Besides the fact that it's misleading for a mail package, customers would much prefer the WordPerfect suite of applications to something called the Borland Office, no offense to my friends at Borland.

8. The media needs to stop harping on the Internet and digital convergence and find something else to malign. We need developers to imagine great products, not the money they can make by creating monopoly markets for mediocre ones. This is just the beginning. Remember the DEC Rainbow? Kaypro? Osborne? The VIC-20? That's where we are with all these emerging technologies. We need to invest wisely.

9. And finally, our federal government (now I *am* starting to sound like Mr. Limbaugh) needs to require ratings for all electronic entertainment and then require consumer electronics and computer vendors to provide fail-safe lockouts on hardware devices. Don't want your kids seeing R-rated violence? Just lock them out.

10. Save us from geographical interfaces, which will become widely seen in the first quarter of this year from General Magic and Apple. These are GUIs which replace traditional icons with tours of desktops, city streets, shopping malls or, presumably, your dresser — all graphically represented on your computer screen. The designers fail to notice that computers are none of these things. Computers are computers.

Coursey is editor of "P.C. Letter," a San Mateo, Calif., industry newsletter. His MCI Mail address is 558-4460.

Apple PowerPC takes on Intel

CONTINUED FROM PAGE 65

sells for half the price of the Pentium (approximately $450 vs. $900). Both Apple and IBM said they will be able to sell PowerPC computers at prices less than those of Pentium-based systems, in effect offering more power for less money.

The big question is whether companies that now use Intel machines will see an advantage in moving to PowerPC as quickly as possible. It seems likely that a reinvigorated Macintosh based on the PowerPC may at least stop current Macintosh customers from defecting to Windows.

"Whenever Apple gives you more bang for the buck, it knocks off another argument against the Mac," said Tim Yancy, a unit manager at Southern California Edison Co.

Intel officials such as Hans Geyer, vice president of Intel's microprocessor products group, dismiss the speed claims of PowerPC and say the real battle will be fought in the software market. "End users don't buy a chip; they buy the software," he said. "If Apple and IBM don't get the volume, they don't get the software, and if they don't get the software, who knows what happens to Apple."

Geyer said Intel's next-generation P6 and P7 are on schedule and should be available at the same time as the PowerPC 603 and 604 — late 1994 and early 1995.

Last summer, Intel President Andy Grove said that Intel sees the move to PowerPC as a prime chance to gain Macintosh users who are nervous about a smooth architecture transition.

"They have an architecture choice ahead of them, and they may be interested in other choices," Grove said. "I think we have an opportunity to gain some converts."

The PowerPC sells for half the price of the Pentium.

Operating systems

CONTINUED FROM PAGE 65

Despite these drawbacks, in the past three or four months corporate users started believing in IBM's vision for OS/2 2.X and AIX, as well as the well-timed OS/2 for Windows, and began buying the product in much larger numbers.

While OS/2's 4 million installed base pales in comparison to Windows 3.0's 40 million, many think the product has turned an important corner.

One company that may mount a challenge on the desktop in the next year or two to both Microsoft and IBM — or at least keep them honest — is Next.

While the Next operating system requires 12M to 16M bytes of memory and at least 150M bytes of disk storage, knowledgeable users said they are so impressed with its advanced interface design, extensive 32-bit features and integrated tools that they believe it has a chance to grab a fair share of the high-end corporate desktop market in the next one to two years as storage and memory costs fall.

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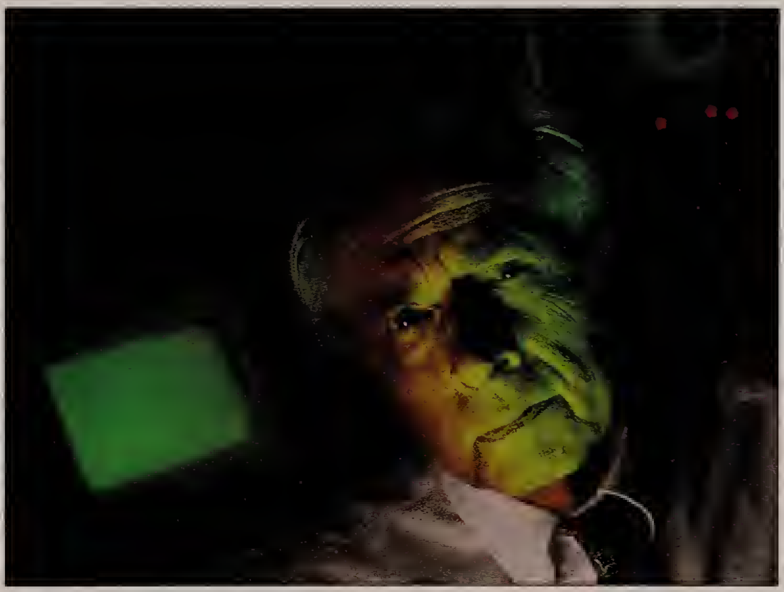

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Bill Jones, MIS, age 38

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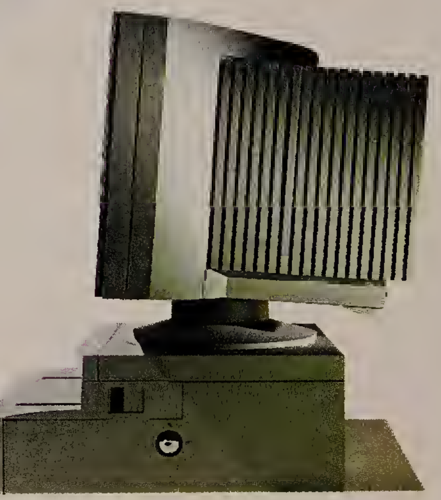

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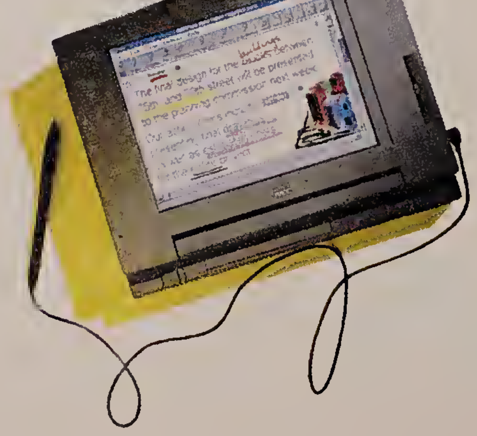

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Forecast '94: Workgroup Computing

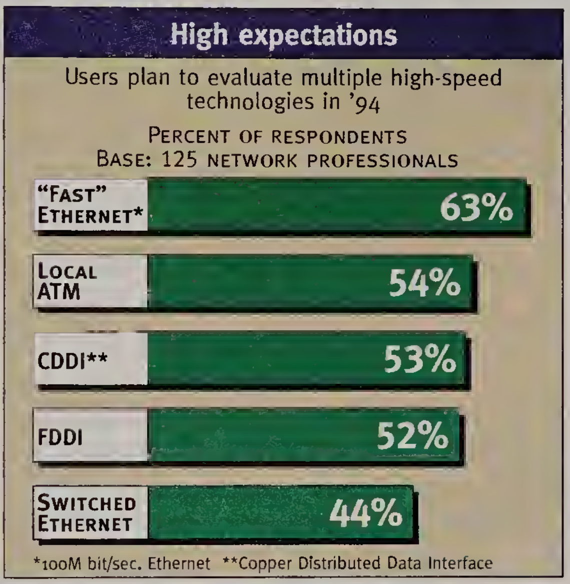
Ethernet switching to explode in '94

Hub vendors rush to capitalize on high-speed networking market

By Stephen P. Klett Jr.

1994 is shaping up to be the year of Ethernet switching technology as vendors scramble to come out with products in a market that analysts say is ready for explosive growth.

"The Ethernet switching market is poised for staggering growth in '94. People are just starting to see what switching is all about and are ready to embrace the technology," said Tam Doloro, an analyst at market research firm Dataquest, Inc. in San Jose, Calif.



Source: Sage Network Research, Inc., Newton, Mass.

Switching hubs separate a LAN into smaller segments and then interconnect them at full network speed. This process cuts network traffic by putting fewer users on each segment and giving servers their own network connections.

Dataquest estimated that 1994 Ethernet switching equipment revenue will be in excess of $140 million, compared with roughly $60 million in 1993.

In addition to increased user awareness, Doloro pointed to the emergence of bandwidth-hungry applications such as multimedia, full-motion video and audio as switching's primary growth facilitators.

Vendors, meanwhile, are rushing to capitalize on the increased demand. Major hub vendors such as SynOptics Communications, Inc., Cabletron Systems, Inc. and Chipcom Corp. are expected to jump into the intelligent Ethernet switching hub market this year, according to analysts.

Small firms in the lead

Ironically, these hub leaders will be following in the footsteps of smaller rivals Standard Microsystems Corp., Grand Junction Networks, Inc. and Synernetics, Inc., which have already started shipping intelligent hubs that switch between customers' existing 10M bit/sec. Ethernet LANs and emerging higher-speed technologies such as Fiber Distributed Data Interface (FDDI), "fast" (100M bit/sec.) Ethernet and Asynchronous Transfer Mode (ATM).

Industry observers said FDDI, ATM and "fast" Ethernet have not yet evolved enough for users to consider them as alternatives to conventional Ethernet LANs. Instead, buyers are looking at ways to merge the technologies through switching.

"1994 will definitely be a hot year for switching. However, vendors who put all their eggs in the proverbial basket are going to be disappointed," said Kathryn Korostoff, president of market research firm Sage Network Research, Inc. in Newton, Mass. Vendors that succeed will be those that support multiple technologies in their hubs because users are interested in evaluating more than one high-speed technology, Korostoff said (see chart).

Users can expect to see a high-end Ethernet hub with TCP/IP routing capabilities and an ATM interface from Standard Microsystems by fall, said Dave Swicker, director of business development at the Hauppauge, N.Y., company. "We believe this will be a trend, and you'll start to see switching hubs that rival high-end routers from companies such as Wellfleet Communications, Inc. in performance," he said.

Switching hub switch

Synernetics, which is being acquired by 3Com Corp. [CW, Dec. 20], said it plans to develop an ATM interface for its LANplex 6000 family of switching hubs, although the company declined to give specifics. Synernetics, based in North Billerica, Mass., recently released the LANplex 6004 hub, which incorporates switched Ethernet connections, intranetwork routing capabilities and an FDDI server connection.

3Com, which resells Synernetics' LANplex 5000 hubs as its LinkBuilder 3GH family, said it will not change Synernetics' development plans.

While most hub vendors offer segment switching capabilities, Grand Junction takes a different route with its FastSwitch 10/100, which provides 25 dedicated 10M bit/sec. Ethernet connections to individual desktops and two 100M bit/sec. server connections.

"We see a bright future in Ethernet switching and providing connectivity to bigger pipes," said Jack Moses, vice president of marketing at Grand Junction in Fremont, Calif. "My forecast is that you'll start to see more and more 'fast' Ethernet products over the next year."

Client/server offerings expand

By Kim S. Nash

■ Long dominated by human resource packages, the off-the-shelf client/server applications arena will become a proving ground for financial and accounting products in 1994. Offerings from archrivals PeopleSoft, Inc. and Dun & Bradstreet Software will have been out for several months, giving users a chance to test the products in real life situations.

Vendors are expected to fill in holes in product lines by adding miscellaneous accounting modules or porting products to various Unix relational databases not already supported, for example.

Smaller companies such as Platinum Software Corp., IMRS, Inc. and Integral Systems, Inc., to name a few, will pour on the competition, trying to differentiate their products by adding imaging, document management and workflow features.

Distinguishing characteristics

Platinum, for example, points to its imaging capabilities as a distinguishing feature in its products. D&B Software has built its own workflow technology into its Financial Stream products. PeopleSoft plans to take a more generic route, building links between its products and Lotus Development Corp.'s Notes and Reach Software, Inc.'s workgroup software.

"Options are opening up quite a bit, which is good for any market," said Bill Reiher, vice president of central systems at Baxter International.

But what is missing from the client/server market, by and large, are choices for manufacturing applications. Avalon Software, Inc. stands out in that sector with its CIIM family, a set of integrated manufacturing and financial systems. PeopleSoft plans to test the waters in the distribution and materials management arena with client/server packages due out in late 1994. The company has said it is interested in manufacturing but is not likely to build such applications itself.

A workgroup world in '94

OPINION BY JOHN DONOVAN

Workgroup computing generates a ton of interest from users and vendors alike. Unfortunately, it has only delivered a few hundred pounds of real progress.

Why the shortfall? Too many people have the idea of workgroup computing turned around. They approach it from the "computing" end. It's time we all recognize that this is wrong — that workgroup computing actually has a much greater impact on an organization's social and business systems than on its information systems.

Properly applied, workgroup computing delivers competitive advantage. Poorly applied, it can be a career killer and inflict damage on the organization.

I've come up with some New Year's resolutions about how I'm going to evaluate workgroup products and strategies from now on. Maybe you can also use them to ensure you're getting the full value of workgroup computing from your investment.

▶ A vendor must convince me that it understands how groups and business systems function before I'll listen to it.

This isn't just jumped-up shrink-wrapped personal productivity stuff anymore. Show me your group or business research or experience before you show your product. No credentials, no demo.

▶ No paradigm shifts.

The users in my company never mob my office begging for new paradigms. They say they want tools that work the way people work.

▶ Vendors must position products in the context of particular requirements and set reasonable expectations.

Workgroup computing runs the gamut from two individuals to enterprisewide networks. If I'm trying to provide better work flow in a small department, please address my needs at that level. Then let me understand what business benefits I can expect.

▶ I'm going to demand the names of five other users, at least three of which must have applications comparable to mine.

Workgroup products are unusually sensitive to the application, so the best test is to talk to people who are in boats

Donovan, *page 75*

NT will find enterprise server niche

By Mark Halper

The multiuser hardware business is one of those industry segments where the crystal ball always portends ever faster and cheaper systems. And while that vision will still apply in 1994, a few other changes are in store.

Perhaps most notably, Microsoft Corp.'s Windows NT operating system will make some inroads.

Although no one expects a herdlike movement to an unproven operating system on the minicomputer enterprise level, users see some departmental possibilities.

Sequent Computer Systems, Inc. got the ball rolling by introducing a line of NT servers early this year, and Digital Equipment Corp. has endorsed NT through its Alpha-based boxes.

Hewlett-Packard Co. is scheduled to introduce in January low-end minicomputers based on a reworked version of the PA-RISC chip that eases the NT porting task.

While users are not clamoring for NT on their HP multiuser systems, few say it is a bad idea.

"I could put HP boxes down on the server level and not have to go out and buy a Pentium," said Jerry Kopecky, manager of MIS operations at IVI Travel, Inc., a Northbrook, Ill., HP 3000 and 9000 shop.

Reliability rules

As NT starts to carve out a place in the enterprise world, multiuser vendors will continue to promote their Unix and proprietary systems for data center work. And as they do so, users will continue to look for more management tools that enhance reliability.

Sam Ellis, associate vice president of information services at Portland Community College in Portland, Ore., for instance, said he hopes to see vendors develop remote procedure calls that will facilitate interconnectivity among computers in distributed schemes.

"People are buying multiple smaller systems and carving chores up among them that they used to do on one mainframe," Ellis said. "The challenge is for someone to be successful in managing all that diversity."

"I'd like to see HP/UX [HP's Unix operating system] become more battle-tested," said John Jazwiec, chief information officer at Barber Colman, Inc., a Rockford, Ill., vendor of environmental and industrial controls. Topping his Unix wish list: management and security tools plus "product data management" tools that would enable various departments in a manufacturing organization to share information.

Meanwhile, users foresee continued belt-tightening by their suppliers, meaning they expect to see telephone support increasingly replacing direct sales support.

"I'm predicting that HP direct sales people will disappear unless you're a big customer," Kopecky said.

Other anticipated changes include the emergence of massively parallel processing (MPP) systems from some multiuser vendors. Pyramid Technology Corp. and IBM are expected this year to join NCR Corp. on the list of vendors furnishing MPP systems to the commercial market.

And of course, users expect continued price/performance improvements in today's uniprocessor and symmetrical multiprocessor systems.

"I'm certainly expecting to see the same kind of performance gains we've enjoyed in past years," Jazwiec said.

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Donovan

CONTINUED FROM PAGE 73

similar to your own.

▶ I'm looking for bulletproof problem-resolution guarantees, not just policies.

If vendors boast "mission-critical" applications, I'll make them back them up with guarantees that recognize that my work is mission critical.

▶ I won't buy anything that won't support all users equally.

Would you remove the telephones from a random 10% of your company's desks? Why should you consider a workgroup product that can't communicate with your DOS, OS/2, Macintosh, Unix workstation or terminal users?

What's in store

Those are my resolutions; now, here's my forecast.

Early in 1994, we'll see the first million-user workgroup product in Lotus' Notes. This "overnight" success has been building since 1989. When Notes hits a million users, third-party support will accelerate. Notes will become this market's first true de facto standard in 1994.

A new wave of products will appear that embody the lessons of workgroup computing's early years. The first new hit of 1994 will be an intuitive conferencing package that lets PC users share a screen across a network or phone line.

The most significant enterprise-capable workgroup products will be offered by systems vendors. They have the experience necessary in corporate information systems and applications. They also have the support depth and resources that users need when contemplating a significant change in a business process.

Look for Digital, IBM and others to play a growing role in enterprise-capable workgroup solutions.

Threat to Windows

The dominance of Windows will be severely threatened when Taligent ships its operating system this year. I saw Taligent at Comdex, and it showed the most comprehensive implementation of all the claimed benefits of object orientation that I've ever seen. My immediate and enduring impression was: "This is the way computing is supposed to work."

One last prediction. Workgroup computing means that a growing proportion of your company's business takes place over information systems. Those IS professionals who excel at understanding and applying workgroup computing solutions will become the new heroes of the business community. Many will end up running their organizations before this decade is over.

Donovan is a senior consultant at WorkGroup Technologies, Inc. in Hampton, N.H.

> Many IS professionals who excel at providing workgroup computing solutions will end up running their organizations before this decade is over.

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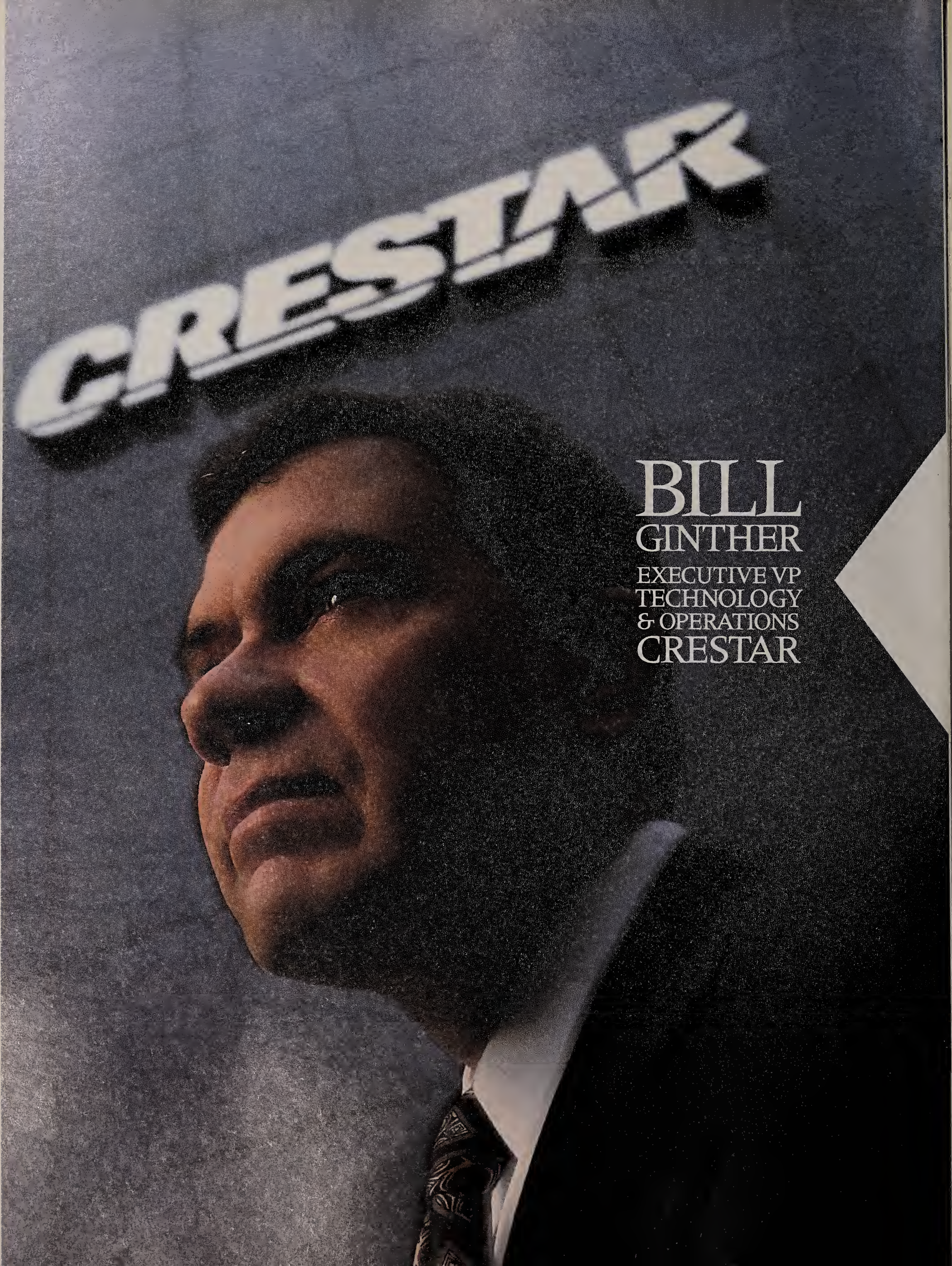

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Management help en route

OPINION BY MARC DODGE

The news has been the same all year — bad. The cost of supporting and administering LANs, PCs and client/server applications is abysmal. Network management problems threaten to do for distributed computing what the Hare Krishnas have done for airports. But, I've got good news. Honest, working pieces are coming. Help is on the way.

Network management refers to the tools and processes we use to keep computer hardware, software and systems humming. Integrated network management (INM) is the advanced stage of network management. With INM, we manage the computing universe with an enterprisewide view instead of managing one piece at a time. INM is how we will slay the client/server hydra.

During 1994, aggressive companies will use INM to begin controlling client/server hardware, software and systems costs. This is good news, but the real shocker is that integrated tools will be available for LANs and PCs before they are available for WANs and the host.

How can this be? Distributed computing is the new kid on the block. For starters, WAN vendors are fighting their version of the 100 Years'

Dodge, *page 80*

LAN services extend reach

By Elisabeth Horwitt

The major network operating system vendors have all promised that 1994 will be a banner year in terms of shiny, technologically breathtaking introductions in the enterprise network services arena.

Some of the more sweeping introductions — Novell, Inc.'s Extended Networks rollout comes to mind — seem more geared to the vendors' long-term profit picture than to users' immediate needs. On the other hand, many of those needs are also being met. For example, next spring Novell will address the needs of companies that want to migrate slowly to NetWare 4.01. It will introduce utilities that will enable NetWare v3.11 systems to access NetWare 4.01's NetWare Directory Services.

Up & coming

Following are other upcoming events, in their approximate order of appearance:

▶ In early January, Novell is expected to announce its Extended Networking strategy for implementing NetWare-based services in industries and environments that are largely new turf for the vendor, such as the factory floor and fast-food outlets.

▶ By spring, Novell is expected to put in place many of the pieces of its AppWare Foundation and Visual AppBuilder client application development environment.

The AppWare family was designed to drastically cut the amount of time it takes for third parties to write client-based applications and to make them automatically portable across multiple client systems. This should benefit users, if only indirectly, because manufacturers will pass their savings on to customers, according to Charles Tilbury, a network analyst at the University of Texas M.D. Anderson Cancer Center.

▶ In the first half of 1994, Banyan Systems, Inc. is expected to provide graphical user interface front ends for its electronic-mail, directory and management services. Users have complained for some time that administering such services with the current front end is difficult and time-consuming.

▶ Banyan is also expected in the first half of the year to ship services that automatically back up data on its networks and manage the distribution and collection of data across multiple locations on the network.

Losing patience

While admitting that such services are potentially valuable, both Novell and Banyan customers are growing impatient for the vendors to provide full-function versions of their network services on more powerful server platforms, analyst and user sources said.

With many companies' server installations and budgets hard-pressed to keep up with present network service and user demands, the last thing companies want to think about is implementing a new set of CPU-hungry services, such as

LAN services, *page 80*

WHAT YOU'LL GET

USER NEEDS TO BE MET IN 1994:

- Integration of enterprise services into a single global directory.
- Multivendor client and server systems management.
- Broader choice of platforms for enterprise services.
- Easier migration from NetWare 3.11 to 4.01 (Novell only).

USER NEEDS STILL TO BE MET AFTER 1994:

- Standards-based interoperability across different network operating system environments.
- Standardized log-on procedures and security administration across different platforms.
- Standardized naming, directory and messaging across different platforms.

Wide-area services

Broadband and wireless top WAN agenda

By Joanie M. Wexler

Major progress in the expansion of broadband and wireless networking infrastructures is on the agenda for 1994, reflecting corporate America's continuing sojourn toward the "virtual office" and "global village."

Deployment of the international-standard Synchronous Optical Network in both the local loop and interexchange networks will pave the way for the delivery of Asynchronous Transfer Mode (ATM), now little more than a buzzword, frame relay and other high-speed networks supporting bandwidth-heavy applications such as disaster recovery.

"There are pent-up applications" in corporate America requiring broadband networks, said Daniel Briere, president of TeleChoice, Inc., a telecommunications consulting and research firm in Verona, N.J.

"People are ready to do things but have been waiting on the economy to be able to afford the equipment," Briere said. He sees the year as one in which the carriers will catch up to user applications with their infrastructure endeavors.

Defining ATM

MCI Communications Corp. will launch its ATM service, for example. Other carriers will better define ATM applications by helping customers with end-to-end ATM setups that go beyond networking gear to medical, imaging or other involved equipment on their premises, Briere predicted.

These activities will in large part result from the continued efforts of the ATM Forum, the unofficial body that has been working toward interoperability specifications for the emerging technology.

On deck for the forum in 1994 is nailing down standards for signaling, traffic management, LAN emulation over wide-area networks and the interconnection of dissimilar networks such as frame relay and Switched Multimegabit Data Service with ATM networks, according to Irfan Ali, the forum's marketing vice president.

He said that 1994 "should be a key year for 'real' ATM," as much of the forum's efforts this year should translate into equipment in both carrier and end-user networks.

On the wireless side, Rob Rich, director of public networks at San Jose, Calif.-based consultancy Dataquest, Inc., said 1994 will be a "banner year" for wireless technology, with the rollout of Cellular Digital Packet Data (CDPD) networks and an expected surge in the availability of mobile hardware and software platforms.

McCaw Cellular Communications, Inc. said that its CDPD infrastructure should be pretty well in place by June, and Rich predicted that Mobilelink, a consortium of cellular vendors that includes the regional Bell operating companies (RBOC) and GTE Mobilenet, will follow suit with a fairly fleshed-out infrastructure by year's end.

PCS hatches

In addition, the federal auction for Personal Communications System (PCS) wireless spectrum is slated for May, though analysts predicted mostly PCS trials in major metropolitan areas in 1994 as opposed to major rollouts.

Integrated Services Digital Network will finally enjoy impressive growth, possibly doubling in use, Rich said, as satellite offices and remote users proliferate.

Also, the feverish partnering of RBOCs with cable TV companies "should settle down, and we'll see a better definition of the strategies," Briere said.

Rich predicted innovative uses next year of the cable TV network, such as access to the global research and academic Internet.

Frustrating year ahead for messaging management

By Lynda Radosevich

In 1994, end users will begin tapping into some of messaging's more sophisticated features, such as work-flow applications and remote access. However, 1994 will be a "year of frustration" for managers charged with creating a stable network infrastructure and directory services (often on limited budgets) that can support the end users without the benefits of big iron, according to users and analysts.

On one hand, end users will have more goodies. Calendaring and scheduling, remote access, mail-enabled work-flow applications, wireless messaging and enterprisewide faxing are some of the services that managers said they will begin providing to their users in 1994.

For instance, "if someone leaves the office for a week, they'll be able to forward their E-mail to someone else and have just the mail that they want sent to them remotely," said Kevin Ryan, director of electronic-mail service at Aetna Life & Casualty, Inc. in Hartford, Conn.

Simultaneously, mainframe shops "will stampede off the mainframe," according to Patricia B. Seybold, president of the Patricia Seybold Group in Boston. "Most large companies have had their E-mail task forces operating for 12 to 18 months, and they are ready to go," she said.

Tool development slow

But some of the tools needed to create stability in the LAN messaging world will still not be fully developed or widely available.

For instance, users and analysts anticipate that vendors will roll out management tools and improved X.500 directories in 1994, but that those products are not expected to mature and spread until 1995.

"Messaging management is an absolutely critical piece, but I expect vendors will still be playing catch-up," said Don W. Price, a technologist at Texaco, Inc. in Tulsa, Okla.

In order to help simplify enterprise management, many large customers will consolidate to two or three E-mail systems, rather than support the half-dozen or more that they do now, said Walter Ulrich, a director at Arthur D. Little, Inc.'s Los Angeles office.

"We're trying to cut down," agreed Roger K. Mizumori, a manager of messaging services planning at The Boeing Co. in Seattle.

Plans by LAN market leaders Lotus Development Corp. and Microsoft Corp. to incorporate X.400 transports are expected to help the consolidation process "as long as the products can interoperate," Mizumori said.

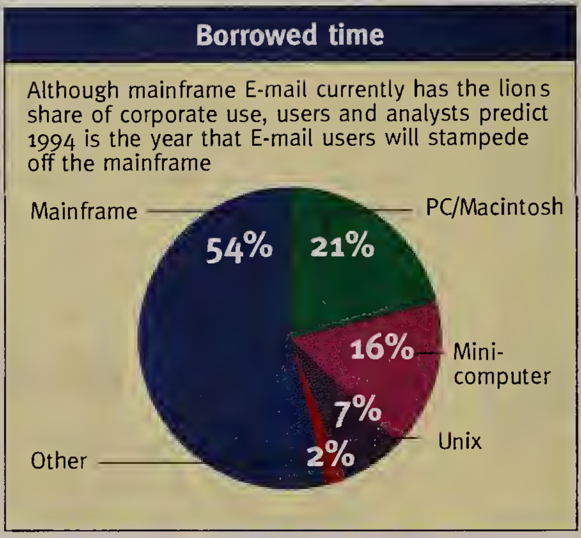
Year of planning

For users on LAN systems, 1994 will be a year of planning for changes as Lotus and Microsoft move their products from file-based to client/server architectures.

"That will require a lot of reconfiguration in terms of directories, administrative tools and management processes," said David Whitten, program director at the Gartner Group, Inc. in Stamford, Conn.

Meanwhile, Microsoft's intentions to ship a free messaging client with Windows 4.0 will require all vendors to rethink their pricing strategies. And users will have to decide whether the free client makes it worthwhile for them to buy into Microsoft's Windows-centric strategy.

"Putting this all together will be hard," noted David Marshak, a vice president at the Seybold Group.



Borrowed time

Although mainframe E-mail currently has the lions share of corporate use, users and analysts predict 1994 is the year that E-mail users will stampede off the mainframe

Source: Ferris E-mail Analyzer, San Francisco

LAN services

CONTINUED FROM PAGE 79

Novell's upcoming multimedia service offering, said Glenn Fund, president of the Boston Area Novell Users Group.

Banyan and Novell claim to be addressing this problem by moving their respective server platforms to RISC-Unix systems. However, both efforts are said to be moving more slowly than the vendors originally promised, or users would like to see.

▶ Microsoft Corp. and Novell will be going head-to-head in the global E-mail services market this year. Microsoft will enter that market for the first time with the announcement of its Enterprise Messaging Server, Microsoft spokesmen said [CW, Nov. 8]. Novell will make the first stab at integrating its Global Messaging Handling Service with its NetWare Directory Services [CW, Dec. 6].

The moves could potentially provide users with the network operating system industry's first industrial-strength enterprise E-mail services outside of Banyan's StreetTalk. Less clear is how soon users will be able to exchange E-mail across different vendors' E-mail platforms via the X.500 standard. All three vendors claim to be providing some level of X.500 compliance, but interoperability may be a year or two away.

Get the ratings

Sixty-nine information systems managers, recently surveyed by the *Computerworld* Database Division, rated network system management as a 4.4 (on a scale of 1 to 5) as the service they would most like to see provided across multiple client/server platforms. A close second was security and/or user access administration (4.3), then software distribution (4.0).

Dodge

CONTINUED FROM PAGE 79

War. They are battling over Unix flavors, RISC workstations, network management platforms and who is really "open." This is professional drivel worthy of any Congressman.

Microsoft, Novell, Lotus et al have knucklehead moments, but compared with the WAN and host folks, they are management saints. Between fighting, they put together the Distributed Management Task Force, Novell's NetWare Management System (NMS) and Microsoft's Hermes. These industry and company-specific initiatives are doing something eerie. They are producing product. This is in sharp contrast to the sick-man of network management platforms — the OSF's Distributed Management Environment.

NMS includes management features for network monitoring, administration, inventory control and remote access. Next year, it will be possible to use NMS to proactively monitor remote LANs and PCs from a central help desk.

Even HP and IBM are moving their industry-leading INM platforms toward client/server solutions. HP will port OpenView to Microsoft's Windows NT. Users will be able to mix and match NT with Unix network management workstations. IBM will port NetView/6000 to NT. And both vendors are bolting PC-specific solutions onto what were once big-iron-only platforms.

The benchmark for INM success is third-party support. No vendor can do it alone. There are too many devices to support. Third-party vendors are delivering solid products that will run on multiple management platforms. Two winners are Intel's LANDesk and Frye Computer Systems, Inc.'s Frye Utilities.

First in line

There are other reasons that INM will come to LANs before WANs. For one, the need is not as pressing in the WAN world. WANs include modems, multiplexers, switches and routers. These tend to be stable and have dependable network management built in. WAN element managers are not integrated, but this is offset by innate dependability and longer times between failures.

And consider the cost/benefit analysis. Getting bucks for corporate network management is a pain in the butt. Put the numbers on paper. The LAN piece is easier to justify than the WAN piece. Why? Because more support people and end users tend LAN/PC boilers.

Fewer people support the WAN. So, the rate of return for WAN-integrated network management is less than it is for the LAN/PC version. As for vendors, they realize that client/server (and cash-register music) won't happen without INM. That is the main reason they are working together.

So, take heart. By this time next year, leading-edge users will show that INM is real. We will begin controlling client/server costs, and LAN and PC vendors will lead the way.

Dodge is telecommunications department manager at a Fortune 100 company.

Briefs

Iowa net chooses Wellfleet

Iowa Network Services, Inc. plans to install **Wellfleet Communications, Inc.** routers in its 1,300-mile fiber-optic network, which provides long-distance services to independent phone companies in the state. The goal is to deliver voice, data and Internet connectivity to Iowa businesses, schools and other organizations via leased-line or dial-up links.

Motorola denies tumors

In an attempt to stamp out fears that cellular phones can cause cancerous tumors, **Motorola, Inc.** issued a press statement that an employee's recent lawsuit is groundless. Various studies have found Motorola employees to be healthy and less cancerous than the average U.S. citizen.

Messaging hub gets client

Control Data Systems said it will ship in January standards-based end-user software for use with its X.400 messaging and X.500 directory hub. Control Data licensed the software from **Enterprise Solutions Ltd.**

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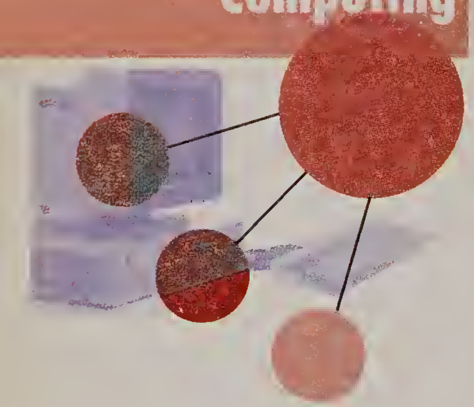
Your candid assessment starts here — status reports from top practitioners. Computerworld moderators navigate a frank and forthright interchange about these three technology uprisings. Esther Dyson, Charlie Babcock and John Gantz lead practitioners from Kmart, Connecticut Mutual Life, the Royal Bank of Canada, and more.

The Practitioner's Forum

Client/Server Computing



Esther Dyson
Moderator

President, EDventure Holdings, Inc. Editor and publisher of the influential newsletters Release 1.0 and Rel-EAST. Release 1.0, widely respected and quoted for over 10 years, focuses on new developments in software and software design, applications, networking and the transforming of new technologies into commercial solutions. Dyson promises a frank and forthright review of the client/server uprising.

David M. Carlson
invited by COMPUTERWORLD

Senior Vice President, Corporate IS, Kmart Corporation, International Headquarters.

Carlson has been noted for creating a vision for automation and technology. The company's retail automation program saves Kmart approximately $200 million annually through UPC symbol scanning, on-line credit authority and automated layaway. Carlson's work has been recognized in awards by SIM and Computerworld.

L. John Severson
invited by NCR

Vice President, IT, at The Trane Company. As VP, IT and Change Agent, he initiated and has provided leadership for a massive re-engineering effort, called Business Transformation. He is responsible for the design and construction of the client/server infrastructure which will enable and support transformed business processes. He has provided IT leadership, pioneering in such areas as end-user computing, telecommuting and outsourcing.

Roy W. Camblin
invited by Price Waterhouse

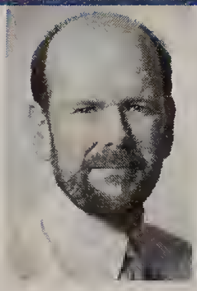
Senior Vice President and CIO for Oracle Corporation, where he is responsible for defining and implementing Oracle's internal information systems and support services. Prior to joining Oracle, Camblin worked at Wells Fargo where he managed technological and operational support for more than $20 billion of business transactions daily. In 1989, he received "Information Systems Visionary Award" for his work in client/server technology.

32 Bit Operating Systems & Apps

John Gantz
Moderator

Senior Vice President, International Data Corp.

At IDC, Gantz oversees research in desktop automation and work group and office computing. His coverage also includes PC hardware, software, and pricing, as well as open systems, PC channel support, and LAN-based computing. Gantz brings 20 years of research authority and candor to a closer look at how 32-bit technology will perform in the trenches.



George Oliver
invited by COMPUTERWORLD

Manager, Information Delivery Technology, Royal Bank of Canada.

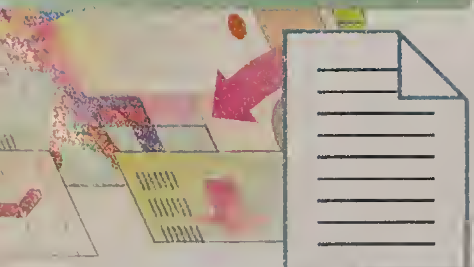
Oliver has spearheaded the Royal Bank's Information Delivery Technology Group which oversees PC, LAN, Security, Self Service and Office Technology products. With this group as the technology catalyst, the Royal Bank has evolved its delivery systems from a central-site computing focus into a distributed cooperative enterprise of mainframes, LANs and PCs.

David A. Pensak
invited by SunSoft

Principal Consultant in Advanced Computer Technology to E.I. DuPont de Nemours, Inc.

As Corporate Advisor, he has had responsibility for planning and managing projects in computer science and technology. He has chaired or served on corporate committees on Open Systems, Data Security, Workstation Selection, Software Auditing, Technology Planning Expert Systems and Electronic Conferencing.

Imaging/Work Flow Technology



Charles Babcock
Moderator

Technical Editor, *Computerworld.*

Babcock reports on the pivotal technologies that are shaping IS in the '90s. In addition to extensive coverage of user and vendor sites, he writes a weekly column on major technology trends and directions. Babcock has served as mid-Atlantic news correspondent, senior software editor and assistant news editor. Working out of the West Coast News Bureau, he brings an astute perspective to the assessment of imaging/work flow technology.

Ronald L. Baker
invited by COMPUTERWORLD

Vice President, IS Architecture, Planning and Operations, Connecticut Mutual Life Insurance.

In the past five years, he has held executive management responsibility for corporate level technology services, including information architecture, corporate business applications, mainframe computing, database services, network services, PCs and client/server computing. He has played a leading role in deploying image workstations and client/server technology.

Michael R. Owens
invited by Wang

Corporate Administrator for the State of Delaware.

He is responsible for direction and supervision of all day-to-day operations of the Delaware Division of Corporations, including administration of a $4.7 million budget. Delaware is home to over 214,000 corporations, including over 50% of the Fortune 500.

When completed, the Open Image project will allow images to be remotely scanned and transferred right into the work flow, processed, and re-trieved to the originating law firm.

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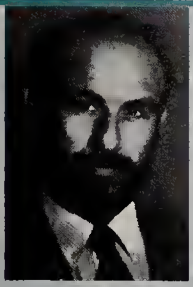

Dale Kutnik
META Group

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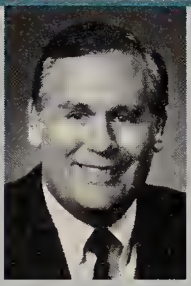
Dale Kutnik is president, research director and founder of the META Group.

Leo Collins
PacifiCare Health Systems



David T. Aldridge
BancOne Diversified Services Corp.

The CTO Perspective

Two CTOs take the challenge: to tell you what their companies have concluded about these three critical technologies. They share their methods, their experiences and their own technology plans.

Leo Collins is director of Applied Technology and Information Architecture for PacifiCare Health Systems.

David T. Aldridge is vice president and chief technology officer for BancOne Diversified Services Corp., a $76 billion corporation in banking and finance.

Catherine Loup
The Research Board

The Uncharted Territory

An exclusive look into the top forecasts and analyses from The Research Board.

Catherine Loup, is partner and vice president of research at The Research Board, which convenes its 90 members to debate findings and to benchmark their experiences and best practices as CIO's of some of the country's most important businesses.

Loup will conclude the Summit with a look into the future of each of these three technologies. Will the other technology trends surpass, supersede or sideswipe client/server, 32-bit systems and imaging/work flow? Will these technologies evolve — or converge — in predictable or non-predictable ways?

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Forecast '94: Large Systems

Users to Digital: Solve sales shortcomings

By Craig Stedman

Digital Equipment Corp. plans to open 1994 with a revamp of its low-end Alpha AXP workstations and finish off the year by introducing 12-processor data center systems. But Digital's attempt to overhaul its sales and marketing operations is expected to hold the key to how well the intervening months go.

Digital continues to catch flak despite recent efforts to upgrade its sales and marketing forces. Users complain about Digital's lack of a coherent long-term strategy, thin technical sales support staffing and salespeople who cannot explain the company's products and are still oriented more toward OpenVMS than Unix.

Loud and clear

The need to improve in those areas or risk losing customers was the dominant message for Digital executives at the Digital Equipment Computer Users Society (DECUS) fall conference in San Francisco in December.

"It's not because we like competitive vendors' products better. It's because we can deal with competitive vendors, and many of us can no longer deal with Digital. And that's a sad situation," said Kevin Oberman, a network manager at the Lawrence Livermore National Laboratory in Livermore, Calif., during a DECUS session with a panel of Digital vice presidents.

Digital is not doing a good job of preparing its sales force, said a user at a large VAX site in the aerospace industry, who asked not to be identified. "A lot of times the customer knows more about the product offering than the salesmen," he said. "You feel bad for them."

Digital is retraining all sales employees and has centralized product marketing in hopes of presenting a more cohesive front, but Edward Lucente, vice president of worldwide sales and marketing, offered no quick-fix promises at the DECUS meeting. "I guess it's just a case of your patience," he told users.

Due to lingering sales and marketing shortcomings and the likelihood that Alpha shipments will not reach heavy volume until the second half of the year, 1994 is expected to be "a dig in and hang on kind of year" for Digital, said Lynn Berg, an analyst at Gartner Group, Inc., a consulting firm in Stamford, Conn.

"The products themselves are sound," Berg said. "It's a question of getting market visibility to them and generating some demand."

Other analysts and users noted that Digital's ability to drive Alpha beyond its installed base could be affected by the advent of the PowerPC architecture developed by IBM, Apple Computer, Inc. and Motorola, Inc. At Comdex/Fall '93, "everybody was talking about PowerPC," said Frank Dzubeck, president of Communications Network Architects, Inc. in Washington.

William Demmer, vice president of Digital's computer systems group, acknowledged the company has "an image problem" that it needs to overcome in order to compete against the PowerPC vendors.

Digital is planning a series of Alpha hardware introductions during 1994 to round out the product line (see story below). OpenVMS for Alpha will reach functional parity with the VAX version when a new release ships in the spring, company officials said, and the DEC OSF/1 operating system is scheduled to gain support for symmetric multiprocessing by July.

Revenue remedy

Digital executives are counting on the DEC OSF/1 operating system to provide most of the company's revenue growth during 1994.

Alpha additions

Digital's 1994 rollout schedule for the Alpha AXP line includes the following:

▶ **RISC PCs:** A low-profile desktop system based on the DECchip 21066 microprocessor and Peripheral Component Interconnect (PCI) bus is due out in the first half of the year; it will run Microsoft Corp.'s Windows NT plus OpenVMS and DEC OSF/1, and pricing is expected to start at about $3,000. Also planned for the first half is a 21066-based version of the DECpc XL deskside machine.

▶ **Workstations:** Clock-speed upgrades for the low-end DEC 3000 Model 300L and 300 workstations are scheduled for January or February; the new models will offer a 10% performance boost with prices similar to the existing machines. In the second half of 1994, Digital will field a high-end deskside model based on a second-generation Alpha chip and incorporating the PCI bus rather than the Turbochannel interconnect.

▶ **Low-end servers:** Digital plans to enter the superserver market in the spring with a four-processor system, code-named Sable, that will use the PCI bus and support 2G bytes of memory and 16 hot-pluggable disk drives. Pricing is expected to start in the $25,000 to $30,000 range, and a half-size version is in the works. Follow-ons to the low-end DEC 2000 Model 300 and 500 systems are due in the second half of the year.

▶ **High-end servers:** Versions of the DEC 7000 and 10000 data center systems with the second-generation Alpha device and support for 12 processors, up from the current limit of six, are scheduled for late 1994. PCI support will also be added, although Digital executives said the machines will have a mix-and-match capability that allows continued use of their existing buses.

Class confusion

OPINION BY TED PRINCE

SO 1994 WILL BE THE YEAR OF THE SMALL system? I don't think so. For all of client/server's sex appeal, 1994 will be the year of the large system. Except that we will not spoil the effect by calling them mainframes. How about something more alluring . . . like virtual reality servers (OLTP, of course)?

Why do I think the large engines will be staging a comeback? A couple of reasons. First, radical modularizing and parallelizing of large systems will lead to equally radical cost reductions. And, as costs come down, so will the

Prince, *page 89*

CA's mainframe revenue keeps growing and . . .

By Thomas Hoffman

For Computer Associates International, Inc., 1993 will likely be remembered for the software giant's big splashes in distributed and client/server-based systems management tools, particularly its intention to deliver CA-Unicenter for approximately a dozen distributed platforms.

But CA has been shipping the systems management package since June on Hewlett-Packard Co.'s HP 9000 Unix-based machines only, and Unicenter will probably bring the vendor less than $100 million in revenue by the end of the company's fiscal year in March, analysts said (see chart).

Still, CA's Unicenter revenue — at least for the near term — will not make or break the vendor. The $1.8 billion Islandia, N.Y., software firm continues to derive nearly 80% of its revenue from mainframe software sales. That trend is expected to continue through 1994, according to analysts.

In fact, CA amazed analysts with its estimated 20% growth in mainframe software revenue during 1993 in the face of an otherwise shrinking market. Most CA watchers, including Stephen T. McClellan, a first vice president at Merrill Lynch Global Securities in San Francisco and Charles E. Phillips at Kidder, Peabody & Co. in New York, project CA will achieve similar growth in 1994.

The analysts are optimistic because CA has patched up hundreds of once-strained customer relationships, not to mention signed dozens of large customers to three- to five-year enterprise licensing agreements, including Citibank NA and the U.S. Postal Service.

"CA is tactically astute because they're locking in those customers for another three to five years while giving themselves more time to tran-

CA, *page 88*

CA outlook

REVENUE:

Fiscal 1993 (year ended March 1993): **$1.84 billion**

Estimated fiscal 1994: **$2.17 billion**

Estimated fiscal 1995: **$2.4 billion**

INCOME:

Fiscal 1993: **$246 million**

Estimated fiscal 1994: **$369 million**

Estimated fiscal 1995: **$456 million**

CA-UNICENTER REVENUE:

Estimated fiscal 1994: **$75 million—$100 million**

Estimated fiscal 1995: **$155 million**

Sources: Merrill Lynch Global Securities; Kidder, Peabody & Co.; Cowen & Co.

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DBMS makers hold the keys

By Kim S. Nash

As a central piece of the client/server puzzle, database makers are in a position to help steer how quickly — and how well — such architectures roll out. Users should watch for several key trends in 1994.

Two camps are staking out ground at the departmental database level, namely Sybase, Inc. and Microsoft Corp. vs. Oracle Corp. and Novell, Inc. While Microsoft introduced an aggressively priced SQL Server for Windows NT database, Oracle made plans to ship a workgroup-oriented database bundled with Novell's NetWare and UnixWare. Like Microsoft SQL Server, the bundle — dubbed OracleWare — ships through resellers.

As the two factions fight for departmental level client/server users, Unix database pricing is likely to fall, analysts said. "Oracle is at a disadvantage if it can't offer comparably priced products," said John Morrell, an analyst at International Data Corp. (IDC). He noted that information systems shops doing client/server in a workgroup setting are likely to think twice about Oracle's historically high prices when Microsoft offers an unlimited-user license for SQL Server for about $15,000.

Parallel processing hot

On the high end, parallel processing capabilities are a hot topic among Fortune 50 users looking to put massive, mission-critical applications on either symmetric multiprocessing (SMP) or massively parallel processing (MPP) machines. Bleeding-edge firms that piloted MPP systems in 1993 should be ready to go live during the next year, for example, American Express Co. and American Airlines, said Richard Winter, principal at Winter Corp., a consulting firm in Cambridge, Mass.

"But the masses are by no means ready to implement MPP databases," he added, explaining that the technology is too new and expensive for mainstream IS managers to plunge into.

Nevertheless, relational database market leader Oracle has promised to add MPP functions to Oracle 7.1, due out in early 1994. Parallel query optimization and on-line backup are likely features. Sybase and Informix Software, Inc. are focusing on SMP, teaming with NCR Corp. and Sequent Computer Systems, Inc., respectively. Both Sybase and Informix are due to ship parallel processing products about the same time as Oracle.

The ASK Group, Inc.'s Ingres division has not made any announcements regarding parallel processing, but a spokeswoman said it is heading toward SMP in 1994.

Object-oriented databases will face a make-or-break year, according to analysts. IDC predicts that worldwide sales of the products will just about double in 1994 to $128 million from an estimated $64 million in 1993. That is a pittance compared with the $2 billion market for relational databases, but the technology will expand beyond scientific systems to more business-style applications, said Steve McClure, an IDC analyst.

Stimulating growth

Meanwhile, relational firms will try to preempt growth in the object-oriented database market by adding their own object capabilities to existing systems. Oracle 8, which Oracle insiders say will be announced by the end of 1994, is expected to contain some object features, such as the ability to do queries on nonstructured data. However, the product is not likely to ship until well into 1995, according to sources.

Sybase will have to find a way to allow SQL Server to embrace objects — beyond support for binary large objects — because its application development tool strategy hinges on object-oriented products inherited with the acquisition of Gain Technology, Inc. in 1993. Gain tools are based on Objectivity, Inc.'s database.

With the possible exception of IBM's DB2, proprietary databases are "not a factor" in major IS database purchasing decisions, said Paul Cubbage, an analyst at Dataquest, Inc. in San Jose, Calif. IBM was smart to build versions of its mainframe DB2 database for AIX and OS/2, he said. "If the mainframe is going to be cannibalized, IBM's going to do it."

Digital Equipment Corp.'s proprietary Rdb database will continue to be enhanced but "is clearly not strategic because of its ties to VAX," Cubbage said. VAX systems are losing their luster as Digital focuses on its new Alpha architecture. And Hewlett-Packard Co. is likely to devote more time to making OpenODB object database a success at the expense of its Allbase, analysts noted.

Shifting tide

DBMS sales for IBM and compatible mainframes are still the market leaders, but Unix DBMS sales will take over in 1995

WORLDWIDE DBMS MARKET BY PLATFORM, 1992-97**

	1992	1993*	1994*	1995*	1996*	1997*
IBM/PCM mainframe	$1,771	$1,890	$2,019	$2,166	$2,327	$2,631
Other mainframe	$251	$263	$276	$292	$307	$347
DEC VAX	$560	$619	$691	$755	$811	$917
Unix	$1,277	$1,558	$1,881	$2,262	$2,696	$3,048
Other minicomputers	$226	$227	$228	$230	$230	$260
AS/400	$375	$422	$471	$526	$587	$664
IBM PC compatibles	$752	$890	$1,047	$1,228	$1,436	$1,623
Macintosh	$124	$155	$178	$204	$237	$268
Other PCs	$8	$6	$6	$7	$9	$10
TOTAL	$5,345	$6,030	$6,797	$7,668	$8,640	$9,769

*Estimated **Figures are database license revenue and do not include service or maintenance fees

Source: International Data Corp. (Framingham, Mass.) and Salomon Brothers, Inc. (New York)

CA

CONTINUED FROM PAGE 85

sition to client/server," McClellan said.

Phillips cautioned that CA's mainframe revenue growth will likely ebb in the next few years as its installed base continues to move away from big iron to distributed systems.

While IBM's System/390 mainframe sales continue to shrink, CA is readying its systems management and database products for IBM's forthcoming System/390 parallel architecture. Those include the CA-Top Secret and CA-ACF/2 security packages as well as the CA-1, CA-7, CA-11 and CA-Scheduler products, according to Mark Combs, a senior vice president of research and development at CA.

Combs declined to say when CA's systems management products would reach the IBM parallel market, but Predrag Dizdarevic, a CA vice president of R&D, disclosed that CA would release its IDMS and Datacom database products for the parallel environment in phases during 1994 and 1995 (see story below).

In 1994, CA will ship its systems management package for varied distributed platforms, including Sun Microsystems Inc.'s Solaris, IBM's OS/2 and AIX, Sequent Computer Systems, Inc.'s Symmetry, Novell Inc.'s NetWare, as well as Pyramid Technology Corp.'s MIS servers, Data General Corp.'s Aviion and IBM's AS/400 platforms, said Marc Sokol, CA's vice president of product strategy.

High-level capabilities

Both HP and NCR Corp., with their respective OpenView and StarSentry distributed systems management packages, are working on high-level management capabilities, while Novell is working to link software distribution functions with the network management capabilities inherent in NetWare, said Jonathan Eunice, research director at Illuminata, a Hollis, N.H., systems software technology assessment firm.

Andrew C. Brosseau, a director at Boston-based Cowen & Co., predicted CA would finish fiscal 1994 with $100 million in Unicenter revenue and that the package would bring in $155 million in sales in 1995.

That is quite a projected sales jump for Unicenter considering that CA has thus far tallied just $26 million — or 32.5% of its total midrange revenue in the past two quarters — through CA-Unicenter for HP/UX sales, Brosseau said.

CA's client/server steps

CA is readying several PC-based client/server-oriented graphical user interface (GUI) business applications for introduction in 1994. These include its CA-Masterpiece accounting package; CA-PRMS, a manufacturing package; CA-HRISMA, a human resources system; and CA-Warehouse BOSS, a warehousing and logistics product. All will be configured for Windows front ends and Unix servers, according to Marc Sokol, CA's vice president of product strategy.

Furthermore, CA will unfold HP/UX versions of its IDMS and Datacom databases this year, with CA-Datacom for HP/UX becoming available in the first quarter of 1994, according to Predrag Dizdarevic, a CA vice president of research and development.

In addition to its application development products, CA will unveil CA-Telon and CA-Realia. These will be designed for programmers to leverage Cobol code in legacy applications and write GUI client/server applications, Sokol said. — *Thomas Hoffman*

Outsourcing-savvy users looking for partnerships

By Mark Halper

With the information systems community having grown more outsourcing-savvy, 1994 is shaping up as the year in which customers will strike deals that force outsourcers to live up to marketing claims of "partnership."

IS shops are looking for ways to price outsourcing deals so that they compensate the vendor based on actual business results derived from the outsourcing relationship.

The trend toward using outsourcers as part of a distributed systems strategy is well under way, so users are looking for new pricing paradigms that rely less on the old CPU cycle and direct-access storage device models of the mature mainframe outsourcing world.

In a model example from 1993, Perot Systems Corp. derives compensation from Europcar International on a revenue-sharing basis. Unisys Corp. derives revenue from Nintendo of America, Inc. based on how many video game cartridges are sold through a Unisys-supported electronic data interchange system.

"A lot more deals are going to be value-based with the price tied into results achieved," said Julie Schwartz, an analyst at Dataquest, Inc.

Vendors and customers agreed, however, that it will be difficult to establish an equitable formula for measuring the impact of an outsourcer on a customer's business.

Slow growth awaits AS/400

By Craig Stedman

1994 looks to be a year of transition on two fronts for IBM's AS/400 line. IBM is expected to fully deliver on the client/server capabilities it promised for the AS/400 last September, and it will also start to prepare for the big 1995 jump to the PowerPC architecture.

A range of products tilted toward client/server computing is scheduled to ship during 1994 to make the AS/400 more competitive with Unix systems. IBM executives acknowledged that AS/400 shipments were likely to be flat or down in 1993, after declining last year from their peak in 1991.

The OS/400 operating system, its integrated database and IBM's TCP/IP implementation for the AS/400 are all being rewritten as part of the client/server initiative. A 486-based I/O processor aimed at file server uses is also due, according to IBM.

However, many of those products are not scheduled to ship until late in the year, which analysts said will probably limit IBM's ability to generate client/server momentum. "There's not a lot of tangible impact now," noted Kevin Beam, director of research at Reliability Ratings, Inc. in Needham, Mass.

David Andrews, managing partner at D. H. Andrews Group, Inc., a Cheshire, Conn., consulting firm, said he expects another year of flat shipments or slight growth for the AS/400. IBM also has to overcome marketing and sales coverage problems resulting from layoffs, he said.

Holding steady

Andrews said 1993 unit shipments should end up in the 45,000 range, down from about 51,000 in 1992, although revenue will probably be close to flat. The AS/400 installed base is approaching 260,000 units, and users do not appear to be moving away from the machine, he noted. "It's not a business that's falling apart."

New AS/400 hardware is expected in the second quarter rather than the usual February time frame; Andrews said a performance boost of about 30% is likely. IBM has hinted that PowerPC chips may show up in limited roles toward the end of the year, but the full migration to that architecture will come in 1995.

Prince

CONTINUED FROM PAGE 85

need to change systems.

Second, the horrible realities of integrity and security issues in large networks will become obvious, even to technology gurus. This means legacy systems are suddenly going to look pretty cool. My hunch is we will see many new applications being built on small machines but run on mainframes . . . er, virtual reality servers.

So parallel DBMS will be hot, and we may even see some old large-systems players gain sizzle — after suitable remarketing, of course (how about Easytrieve Multimedia?).

Here's one sequence of possible events to ponder:

First: IBM finally gets real mean and drops prices for its mainframes below those for Unix mainframes (in terms of cost per MIPS).

Then: In response, some Unix mainframes offer emulation of MVS, add CICS and drop their prices, too.

But: Mainstream Unix mainframes push MPP even harder to grab back the price-per-MIPS edge. Borland announces Parallel Paradox (delivery 1998).

So: The prices of large systems drop so much that people begin to use them as servers for all kinds of activities. Many of the small server vendors promptly go broke and sue IBM again for antitrust.

As a result: Even more new types of transaction processing monitors are introduced to deal with these new types of data. CICS/MM is an instant hit.

Of course: This spurs the fast market penetration of parallel DBMS, led by Oracle, which results in major reductions in cost per transaction. Other DBMS vendors without the parallel option respond by offering their add-on applications in suites. The DB2 suite flops, however, and ends up bundled with Lotus' SmartSuite (with Quicken thrown in for free).

As you might expect: A price war, far worse than the one we've seen to date, breaks out among mainframe vendors, pushing price per MIPS to unprecedented low levels and below the MIPS costs of client/server systems.

But then: Small systems fight back by tying distributed servers into virtual mainframes, using ATM and cable for wide-area channel speed.

All types of systems add CD-ROM and optical RAID and because of massive storage, claim they are a large system irrespective of their processors' power or the integrity and security they provide to their OLTP systems.

Would you believe? The edge in these mainframe wars is provided by transaction processing monitors, so the competition among these monitors heats up. Client/server tries a sneaky fight back by claiming that NT with Top End from NCR gives you all you ever had with IMS, MVS and CICS. A series of unholy alliances results, leading to the ES/9000 Windows, the NT/CICS and the SynOptics/Oracle Universal MPP server large systems.

Result: We all end up being thoroughly confused as to what the difference is between small and large systems, since client/server finally gives up and offers real security, integrity and even lower prices, and we start all over again.

Stranger things have happened.

Prince is president of Perth Ventures, Inc., a strategic technology consulting firm in Hawley, Pa., and New York.

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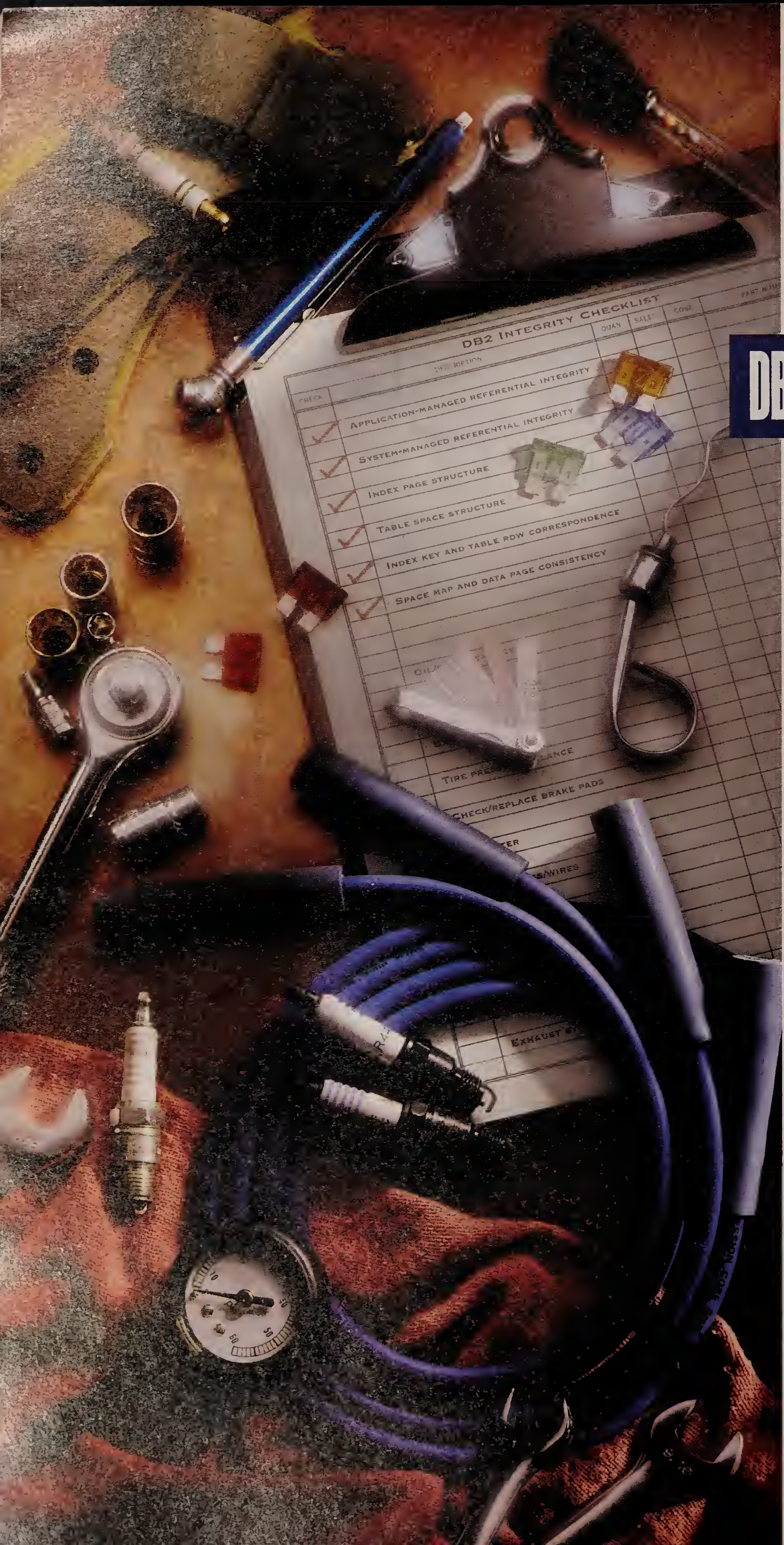
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Yourdon

CONTINUED FROM PAGE 91

CASE (I-CASE) technology: A $400 million contract has just been awarded to a consortium led by Lockheed. I believe the ramifications of this contract will give the entire CASE industry a massive jolt of adrenaline. By focusing on integration of tools, the DOD might be able to accomplish what IBM hoped to accomplish with AD/Cycle.

Back to object orientation for a moment. One of the things we'll see in 1994 is the emergence of object-oriented Cobol.

Will anyone care? For the most part, the PC community of C++ hackers and Smalltalk purists will snicker. But if the insults get too nasty, the Cobol community has a right to ask, "What kind of language did you say C++ was? An evolutionary upgrade from an older language or a hodgepodge that encourages both the best and the worst of object orientation programming?" Sounds like object-oriented Cobol to me!

Off the sidelines

I'd rather avoid both C++ and object-oriented Cobol, but there are millions of Cobol programmers who have been watching the object orientation movement from the sidelines; with features such as inheritance, polymorphism and encapsulation in their language, maybe they'll join the game, too.

On the software engineering front, the big news in 1994 will probably be the initial version of an ISO-9000 standard specifically aimed at software; the current nonspecific version is widely touted in Europe but has been loudly criticized in the U.S. as being irrelevant, if not downright harmful.

Even more interesting will be the efforts by the Software Engineering Institute to combine the best ideas of ISO and the institute's process maturity model.

New versions of the institute's model are also being developed to incorporate "peopleware" concepts. This should help focus the attention of many companies on the negatives of a current approach that Software Engineering's Bill Curtis calls the "herded" approach, which refers to organizations treating their professional software people as if they were cattle.

So much for what we can reasonably expect — but what would we *like* to see in 1994?

Dear Santa . . .

Here's the list that I left for Santa with a note saying anytime in the year would do.

First, I would like to see Microsoft fall flat on its face for a month or two in 1994, so that it could acquire some humility and avoid a disastrous IBM-style collapse a few years later.

Second, I wish a software organization, somewhere, would demonstrate with some credible metrics that it can achieve order-of-magnitude productivity and quality improvements through software reuse.

And third, I wish a software organization would confirm, with some credible metrics, an observation that Tom DeMarco made at the Fall '93 CaseWorld conference: that there is no such thing as overtime in a software project and that "overtime" is a political game that we play to avoid feeling guilty when the project is late. Software is lots of fun, as we all know — but it might be a lot more fun if we didn't always feel compelled to work 80-hour weeks.

Whaddya say, Santa: Can you make that last wish come true?

Yourdon is author of the book *Decline and Fall of the American Programmer* (Prentice Hall). He is also a management consultant and editor of the software journal *American Programmer*. He can be reached at 71250.2322@compuserve.com.

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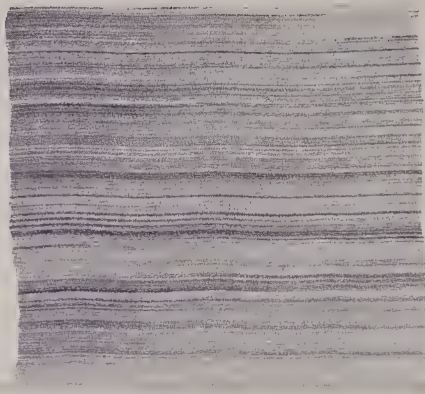

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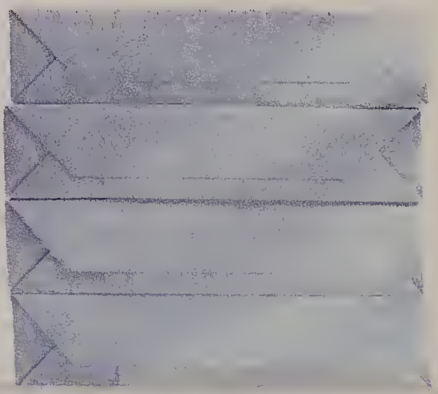

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Standards

CONTINUED FROM PAGE 91

The OMG is expected to release the final interoperability specification by third-quarter 1994, and products supporting it are likely to begin shipping by late 1994 and early 1995.

"I think vendors are really anxious for that standard to emerge, as are users," said Hugh Bishop, vice president at the Aberdeen Group, a consulting firm in Boston.

Working now in tandem with the OMG is an ISO committee that is setting the international standard for ODP. ODP is a reference model that offers an architecture for enabling the creation of distributed processing systems.

While the OMG has spent time establishing the specifications from the ground up for distributed object services, Microsoft has made OLE a de facto standard for Windows programmers.

Microsoft is creating a distributed version of OLE, which had previously existed only on the desktop, and began shipping a preliminary developer's kit last month. Distributed OLE is expected to ship during the third quarter of 1994.

Digital participated in the first cross-platform demonstration for distributed OLE last November and will establish, with Microsoft, COM as a technology that will enable OLE objects to interoperate with CORBA objects. COM will include a communications protocol based on the Open Software Foundation's Distributed Computing Environment and a subset of OLE and Digital's CORBA-compliant Object Broker.

The two companies will ship an early cut on the specifications for industry comment and review during the first quarter of 1994, with a general release targeted for the third quarter.

OpenDoc, an object-oriented technology and self-styled rival to OLE for creating and managing distributed, compound documents, will ship during 1994. OpenDoc is being developed by CIL, a group of vendors including Apple Computer, Inc., IBM and WordPerfect Corp. The developer's kit for OpenDoc will be available in the first quarter of 1994.

Briefs

Cadre to supply IBM CASE

Cadre Technologies, Inc. in Providence, R.I., was selected by **IBM Federal Systems Co.** to be the primary provider of computer-aided software engineering tools for the U.S. Army's Sustaining Base Information Services project, a 10-year, $474 million effort to build a worldwide information and telecommunications system for business and administrative functions.

Wang names VP

Wang Laboratories, Inc. has named Dale Troppito vice president of applications tools and services, with responsibility for development of the company's Pace database and development tools plus other products. She worked previously at **Molecular Simulations, Inc.**, a Burlington, Mass., software vendor.

Microsoft, Spectron deal

Microsoft Corp. has signed a deal with **Spectron Microsystems** under which it will license Spectron's application programming interface (API) for digital signal processors as part of a bid to create standards for multimedia Windows applications. **Media Vision, Inc.** also licensed the same set of APIs.

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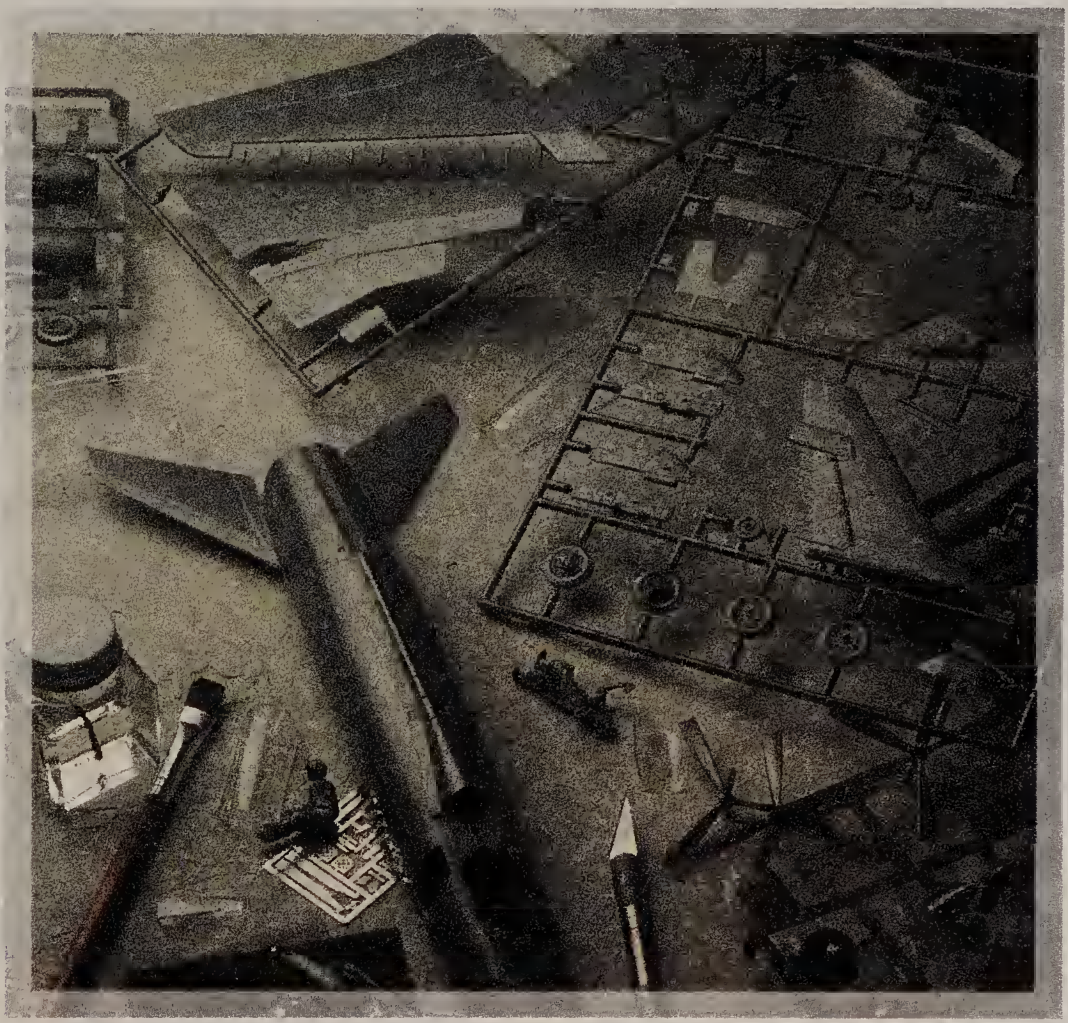

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NT won't drain the WINDOWS savvy

NEED to know

By David Baum

Learning to program in Microsoft Corp.'s Windows NT environment presents its share of hurdles, but many developers find they can draw on past experience.

"I wish I had known at the first Windows NT developers conference that programming for NT was going to be as easy as it is," says Mark Burgess, president of Knowledge Works, Inc., a software development firm in San Diego. "The number of changes from Windows 3.1 that you have to make to get a program up and running aren't all that significant."

Other programmers agree. "You are way ahead of the game if you have Windows 3.1 mastered," says Ben Elsworth, an application development manager at Sapiens USA in Goleta, Calif. "The difficulty with both operating systems is learning the Windows application programming interface [API]. But once you've mastered it under Windows, Windows NT is essentially the same."

If you haven't been exposed to either API, expect a six-month learning curve. After that, your big adjustment when moving from DOS or Windows to Windows NT is learning how applications are loaded and memory is allocated.

You must change your frame of reference when programming for Windows NT, Burgess says. In both Windows 3.1 and Windows NT, each application can be loaded into memory multiple times. With Windows 3.1, however, the operating system must allocate memory to each application through 64K-byte segments, or "instances." Developers distinguish between two concurrently running copies of the same program with the "Get Instance Handle" function.

NON-EXPOSURE

If you're not familiar with Microsoft Corp.'s Windows or Windows NT application programming interface (API), plan on a SIX-MONTH LEARNING CURVE to gain proficiency. The Windows NT API is a superset of the Windows API, with slightly different parameters and about 200 additional programming interfaces to know.

This function is not necessary when programming for Windows NT; each application runs in its own address space as a separate process with its own system message queue. In fact, some programmers find NT much easier than Windows for this reason. "Once you are used to straight programming in a flat address space, as you can do with NT, then dealing with data segments, instance handles and compiler switches is a tedious business," Elsworth says.

32-bit complexities

Programmers can also draw on past experience when it comes to mastering multithreading and multitasking, two key capabilities that set Windows NT apart from its predecessor. If you have used another 32-bit operating system, such as VMS or Unix, you shouldn't have any problem adapting. However, if you have only programmed for 16-bit PC operating systems, NT will require a major shift in thinking.

With DOS, programmers work in a procedural, serial fashion. Users respond to predefined prompts, and programs follow a linear progression. Under Windows, programs respond to events initiated by users. Users can initiate events in their own time and in their own way.

Windows NT is also event-driven, but it also enables multiple tasks to be performed inside the same application at the same time, or multithreading.

"Multithreading takes some getting used to, but once you understand the concept you can use it to speed up your programs," Burgess says. "For example, you don't have to wait until you finish drawing an image before you send the drawn segments to the printer. The application can do both at the same time."

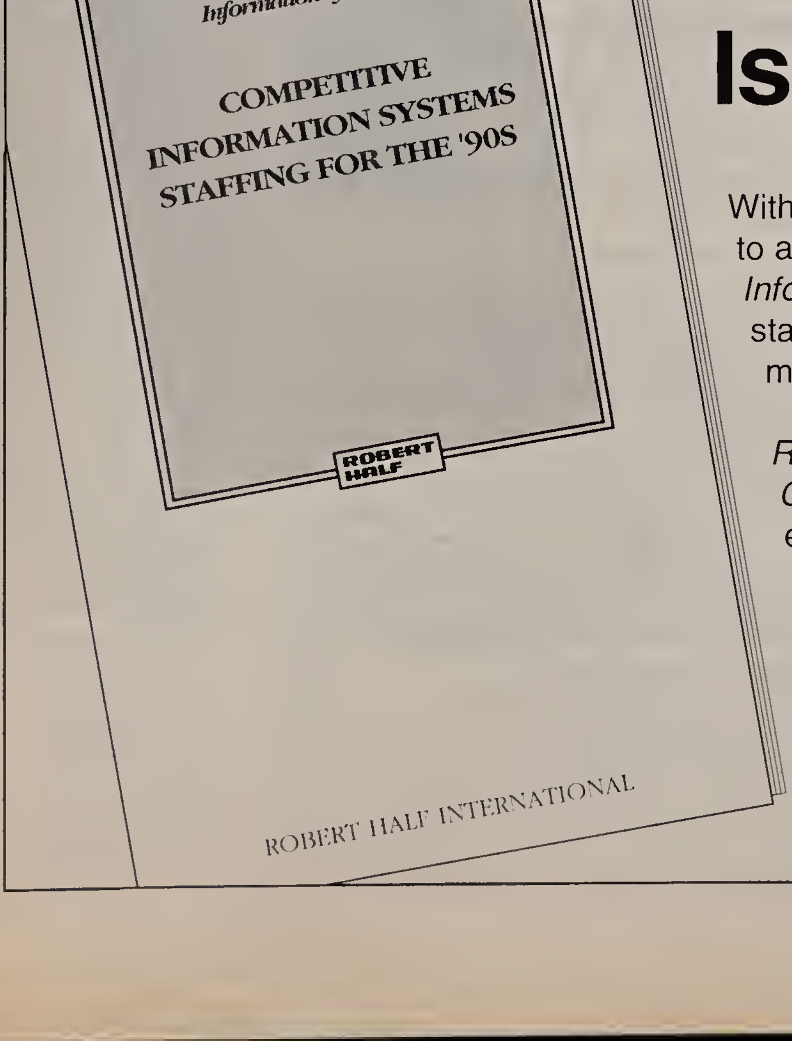
Multitasking can also be difficult at first. "In a multitasking environment, there are many simultaneous processes running which can affect the order and priority of application events," says Keith Therrien, president of TAD Consulting in Reading, Mass. "This makes issues of application timing and performance very difficult to predict, and forces developers to do extensive application testing."

However, these issues are well-documented in the Microsoft manual, and 32-bit messaging is discussed on the developer's CD-ROM, Elsworth says.

Despite the hurdles, most developers say they feel NT is worth the trouble.

"NT is the crossover point between PC and multitasking operating systems," Therrien says. "Other operating systems have had preemptive multitasking capabilities, but Windows NT is one of the first multitasking operating systems for the PC."

Baum is a free-lance writer in Santa Barbara, Calif.



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WANTED: Project managers who can estimate realistically

Can accurately estimating a project's cost help your career? It seems so, according to a survey of information systems managers conducted by the Center for Project Management in San Ramon, Calif., and the Association for Systems Management in Cleveland. With 124 managers responding, only 36% said their project managers were either well-prepared or above average in their ability to develop viable estimates, while 64% said their project managers were average, below average or hardly prepared at all.

FEAR MAY BE PART of the problem, says Joe Kollinger, a project manager at Pacific Bell's systems technology division in San Francisco. IS project managers are often reluctant to negotiate for project costs and deadlines because they are afraid to challenge project sponsors.

"If you've always run an eight-minute mile, why agree to run a three-minute mile just because someone says you have to?" Kollinger says. "Look at your past experience, your project history and build an effective case for why you can't [meet a short deadline] and the project sponsor will come around."

AND JUST HOW MUCH can you expect to make with such skills under your belt? A project manager in a large company, defined as having an IS staff of more than 50, can earn as much as $56,000 as a project leader and up to $70,000 as a senior project manager, according to Robert Half International, Inc. Moreover, project management salaries seem to be on the rise, according to statistics.

Project management salaries up from '92

	'93	'92
SENIOR PROJECT MANAGER	$55,000-$70,000	$53,000-$68,000
PROJECT MANAGER	$50,000-$64,000	$48,000-$61,500
SENIOR PROJECT LEADER	$48,000-$61,750	$46,000-$59,000
PROJECT LEADER	$44,500-$56,000	$43,000-$54,000

Source: Robert Half International, Inc., Menlo Park, Calif.

Betting on business units

If you're wondering where all those career opportunities in the business units are, check out the IS reporting structure for clues.

An Ernst & Young/Society for Information Management International study, "Leading Practices Report 1.1," revealed that a direct correlation exists between the closeness of IS/business partnerships and whom IS reports to. When an IS group reports to the chief financial officer, IS is defined in terms of service-level agreements rather than contribution to the business strategy.

However, if an IS group reports to a business unit chief executive officer, or a corporate chief information officer, IS can lead the shaping of business strategy by looking for ways that technology can create new business opportunities.

REACTING TO END USERS

Do you ever feel like you're spending all your time reacting to crises while everything else you're supposed to do lapses? You're not alone, according to a Nolan Norton & Co. multiclient study, "Managing End-User Computing." Nolan Norton discovered that "it is typical to observe end-user computing staff spending most of their time in the technical and user support areas, generally in reactive mode," and even drawing staff away from planning, research and management tasks. The bulk of staff energy is spent on troubleshooting, help desk calls, installing and testing hardware and software and monitoring systems performance. This trend is expected to continue, the study said.

Teaching an OLD DOG

Just what are those books that give managers such lofty ideas? "Essential," says Madeline Weiss, president of Weiss Associates in Bethesda, Md., and chairman of the Society for Information Management's international strategic planning committee.

"We need to be continuous learners," she says. "We have to be open to different perspectives." Here is one of her suggestions:

The Dancing Healers by Dr. Carl Hammerschlag (1988, Harper & Row, New York) discusses the importance of adopting and learning from new perspectives. "You need to look beyond your own way of doing things and find new approaches. The author spent years living on Indian reservations studying how different tribes heal. Part of the process is that you have to do the dance. In IS, if we want to help, or heal the client, we have to do the dance — we have to take an active role and get in their shoes and see their perspective."

—Compiled by Leslie Goff

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TECHNOLOGY PROJECT MANAGER
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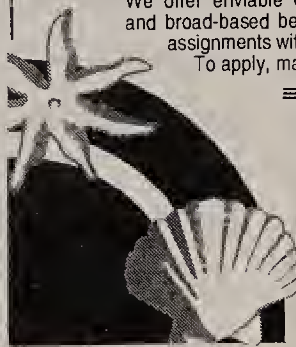

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NETWORK SUPPORT ENGINEERS Should have thorough technical knowledge of T3/T1 WANs and state-of-the-art internetworking technologies, LAN-networked PC-based Element Management Systems (EMS), multiprotocal networks, channel extenders, telco operations, SNA, matrix switches, modems, IBM front-end processors, and dial-in data services. Environmental software interfaces; hardware installation and testing; problem, change, capacity, performance and service level management experience helpful. Responsibilities include providing second/third level support, utilizing hardware diagnostic devices, network EMS and software tools.

SOFTWARE SYSTEMS PROGRAMMERS Should have system software programming ability with experience with Assembler, SMP/E, JCL, IBM Utilities and TSO. In addition, should have knowledge of at least one of the following: (A) design, coding implementation and maintenance of MVS/ESA and JES2; (B) IMS/TM and IMS/DB; or (C) VTAM, NetView and NCP. Problem-solving skills including dump reading and debugging, and IMS internals knowledge helpful.

OPERATING SYSTEMS PROGRAMMERS (NETWORK) *[Note: positions exist at all 3 sites.]* Should have experience installing, "genning" and maintaining SNA networks with ACF/VTAM, ACF/NCP and related network hardware and knowledge of all phases of operating systems programming applications. Knowledge of Token-ring, NetView Clist (REXX) and Assembler language programming helpful.

SYSTEMS INTEGRATION/STRATEGIC PLANNING ADVISORS Should have a thorough knowledge of all aspects of data processing and/or data communications in a large IBM mainframe environment, with strong analytical, communication, planning and management skills required. Will function as a technical consultant supporting our automation consolidation activities, planning and coordinating the implementation of the strategic technological direction for the Federal Reserve System. Responsibilities will include project development, system design and testing, requirements definition and technology assessment.

ACF2 ADMINISTRATORS Should have experience maintaining, administering and working with ACF2. Should also have a solid technical knowledge of ACF2, with experience using ACF2 to secure other environmental products. Knowledge of data security procedures and concepts important.

DB2 SECURITY SPECIALISTS Should have thorough technical knowledge of DB2 security implementations using secondary authorization IDs. Familiarity with release 2.3 of DB2 required. Experience with CA-ACF2, Ca-ProSecure, Platinum DB2 products, BMC's DB2 activity monitor, IBM's DDCS/2 LAN connections to DB2's DDF facility, data security procedures and concepts helpful.

SYSTEMS PROGRAMMERS/SYSTEMS SECURITY Should have experience with SMP/E, JCL, IBM utilities, ACF2, SAS, TSO and full knowledge of MVS/ESA, JES2, IMS, VTAM, NetView and NCP. Will coordinate the development, implementation, monitoring and maintenance of data security components of environmental software.

TECHNICAL ADVISORS: A/O ENGINEERING Should have knowledge of MVS-based systems programming, data processing operations, NetView, systems design and development, and high and low-level languages. Diagnostic and communication skills, software engineering, network management and automated operations concepts, AOC/MVS, ANO/MVS and REXX coding, project management techniques, OS/2, IMS, CA7 and INFO/Management knowledge helpful. Will participate on an Automation Engineering development team responsible for the planning, design and development of the automated operations environment.

PRODUCTION CONTROL COORDINATORS/ANALYSTS *[Positions exist at all 3 sites.]* Should have experience managing production job schedules using CA-7, including developing schedules, monitoring jobs/schedules, and performing restarts using CA-11.

QUALITY ASSURANCE ANALYSTS *[Positions exist at all 3 sites.]* Should have experience with MVS, IMS, DB2, VTAM, COBOL programming, JCL (and utilities) and TSO/ISPF in a large mainframe environment. Experience with change management tools (ENDEVOR preferred, or InfoManagement, SynoTrac and Change Action) and PC or mainframe-based automated testing tools, and SAS (or similar language) and contigency planning helpful.

NETWORK OPERATIONS MANAGERS/TECHNICIANS *[Two functions represented.]* Should have thorough technical knowledge of T3/T1 WANs and state-of-the-art internetworking technologies, LAN-networked PC-based Element Management Systems (EMS), multiprotocol networks, channel extenders, telco operations, SNA, matrix switches, modems, IBM front-end processors and dial-in data services. Environmental software interfaces, hardware installation and testing, problem, change, capacity, performance and service-level management experience helpful. Manager-level applicants also require prior supervisory or management experience. Will manage or perform day-to-day shift and weekend activities supporting the Federal Reserve national network, coordinating with other shift personnel, network support engineers and vendor personnel.

DTN TECHNICAL ADVISORS Should have extensive knowledge/experience with 374S architecture, SNA networks in a large systems environment, network management skills in areas of network diagnostics and monitoring tools including NetView, Moss (Moss/E) and NPM. Will serve as technical resource for the Federal Reserve's FEDNET/Data Transport Node (DTN). OSI, X.25 and LAN/WAN experience helpful.

CHANNEL EXTENDER TECHNICAL ADVISORS Should have thorough knowledge of channel extender networking including large IBM systems peripheral devices (tape, printers, consoles) experience; circuit design, network management, capacity management and performance monitoring, LAN/WAN technology design/implementation.

PROCUREMENT ANALYST Should have experience with financial analysis, planning, problem-solving, information systems technologies and operations research methods. Experience with Requests for Proposals (RFPs) and/or Invitations for Bid (IFBs) relating to data processing equipment and software helpful. Should also have experience managing vendor relations.

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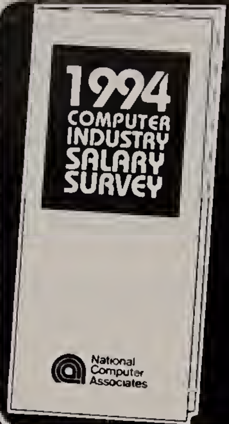

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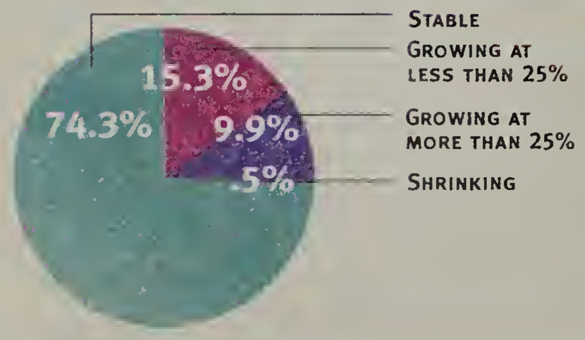

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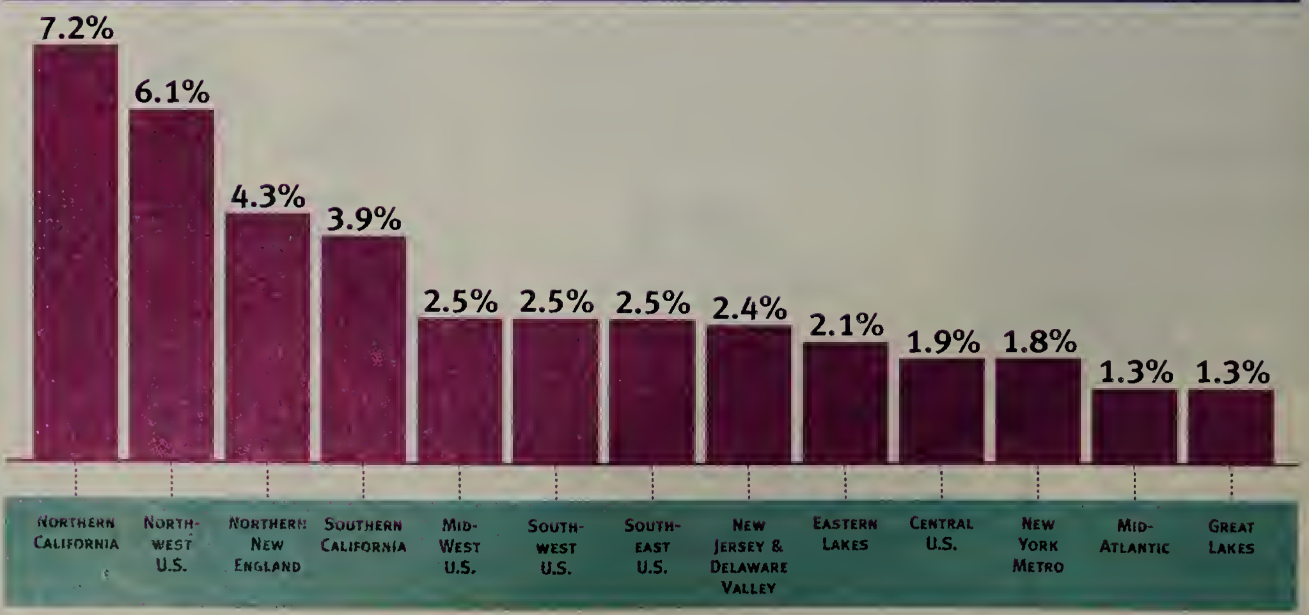

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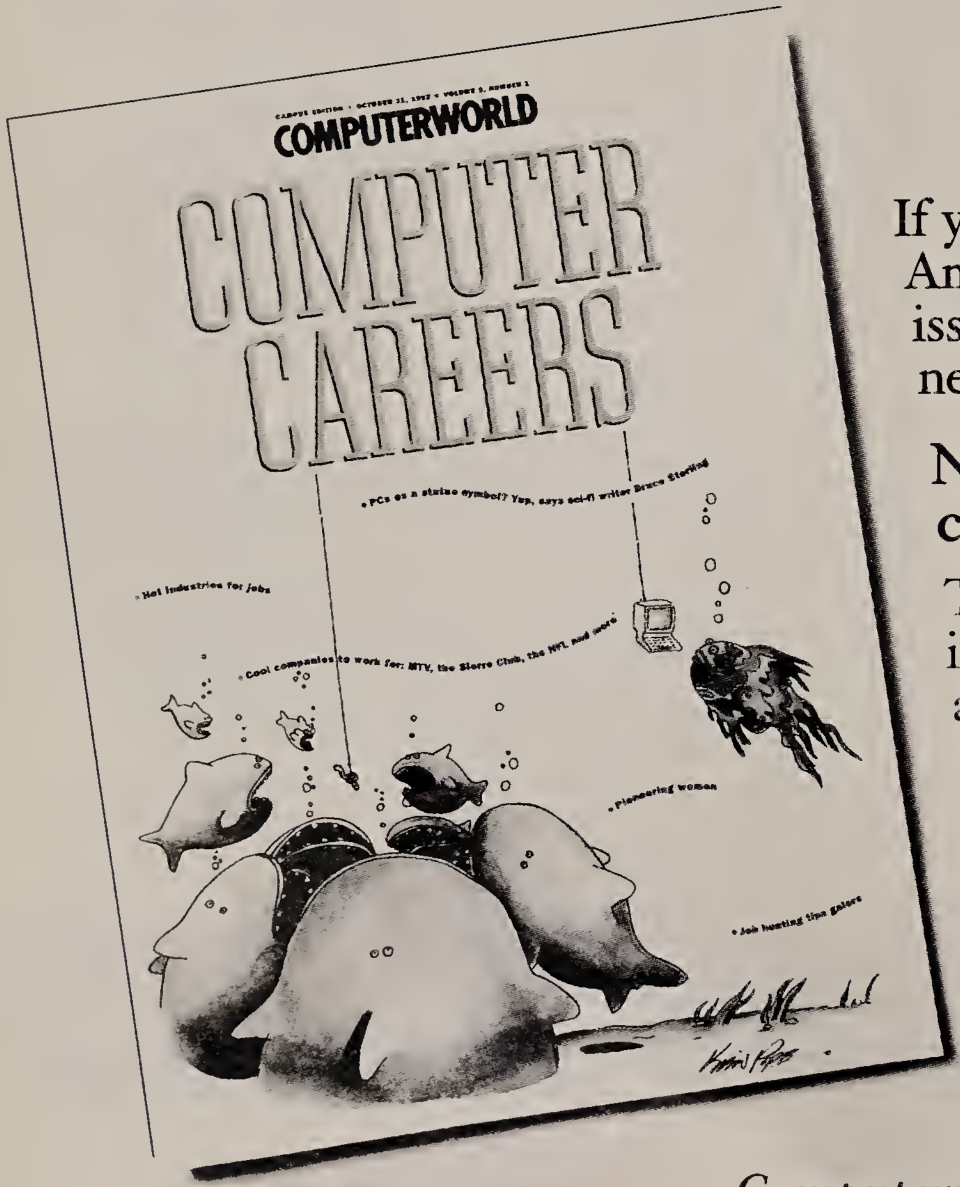
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- Information Systems salaries from Computerworld's annual survey with the Association for Systems Management
- And much more!

Benchmarketing

By Julie Hart

shopper alert!

If you haven't had a chance to take a behind-the-scenes look at benchmarks, you've probably been bamboozled a time or two.

In most cases, each vendor benchmarks its own products. "They may use equipment, or compilers, that aren't widely available," says Phil Magney, vice president of research at ARS, Inc. in Irving, Texas. "That's why users can never completely replicate the kind of results reported by vendors."

In addition, because benchmarks are often shaded by marketing pressures, some of the standards organizations do not require vendors to disclose pricing information. "It's too controversial an area," says Phil Piserchio, sales manager at AIM Technology, an independent benchmark firm in Santa Clara, Calif.

When you read an advertisement for computer equipment, for instance, it often highlights performance numbers. It doesn't, however, list the system configuration used to create those results, as well as its cost.

The vendor may have also optimized its test system in any number of ways, such as allowing preprocessing of data or holding applications in RAM.

"If you keep everything in RAM, you can chew through a lot of information fast," says Kim Shanley, chief operating officer of the Transaction Processing Performance Council. "If you have to go out to the hard disk to read and write, your system can slow down by a thousandfold."

"Customers shouldn't care about performance benchmarks by themselves," says Andrew Allison, industry analyst and editor of *The Bench Press Quarterly*, published by Elk Horn Publishing in Watsonville, Calif. "The results are always inflated. When looking at benchmarks, price/performance is what counts most."

Although price/performance information isn't always revealed, it is available to the general public. "Ask the vendor to send you a copy of the benchmark report," Allison says (see story below).

So what can you do to fight back? When planning a large purchase, use your leverage with manufacturers to obtain hardware on loan. "Take your most important applications and port them to each and every system and determine which you like best — based on performance and usability," Magney says.

Hart is a free-lance writer in San Jose, Calif.

SCRUTINIZE REPORTS

Benchmark reports from vendors reveal many things. Check for the following:

Configuration
The report lists the exact system configuration used. This is where optimization frequently occurs. If you're using a different configuration, you can only guess about your system's performance.

In addition, check the operating system version used. If it's unavailable, or if you haven't upgraded to it yet, your results will be lower.

Compiler switches
Benchmarks are often inflated using multiple compiler switches, many of which are unreleased versions. Most users, however, don't run sophisticated compiler switches; therefore, the results will not be the same.

CPU in MIPS
Approach MIPS ratings with caution. A range of methodologies can be used to calculate MIPS, which means that benchmarks may not be comparable to other reported ratings.

Application table
This is generally a bar chart of application benchmarks. If one or two of the results are significantly higher, chances are some of the components have been optimized. To find out more, request a description of applications run.

Source: Andrew Allison, editor of *The Bench Press Quarterly*.

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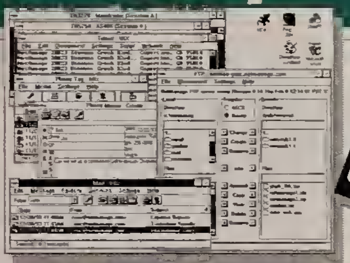

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Sol RFP P359, Due 020294/Contact point, Lisa OeGrace, 404/848-5467. Olferors are requested to propose a system for MARTA's Division of Facililies Maintenance for contracting of maintenance and repair of minor construction projects. The Job Order Contracting System must be a tully integrated, interaclive system using the state-ot-the-art in information system technology The system proposed must establish an interactive support environment which will allow MARTA (Facilities Maintenance) to improve employee productivity and increase service/reliability. The proposed system should be comprised ot three major documents: 1) location specific unit book, 2) detailed technical specifications, 3) terms and conditions. The proposed solution should include applicalion sottware, implementation support, data base development, delivery and installation, training, software maintenance, and protessional services. The proposal deadline is February 2, 1994. A pre-proposal meeting has been scheduled for January 5, 1994. To obtain & document contacl or call: MARTA Oocumentation Conlrol Center, 2424 Piedmont Road, N.E., Lobby Floor, Atlanta, Georgia 30324-3330, 404/848-5580. The cost ot RFP P359 is $25.00.

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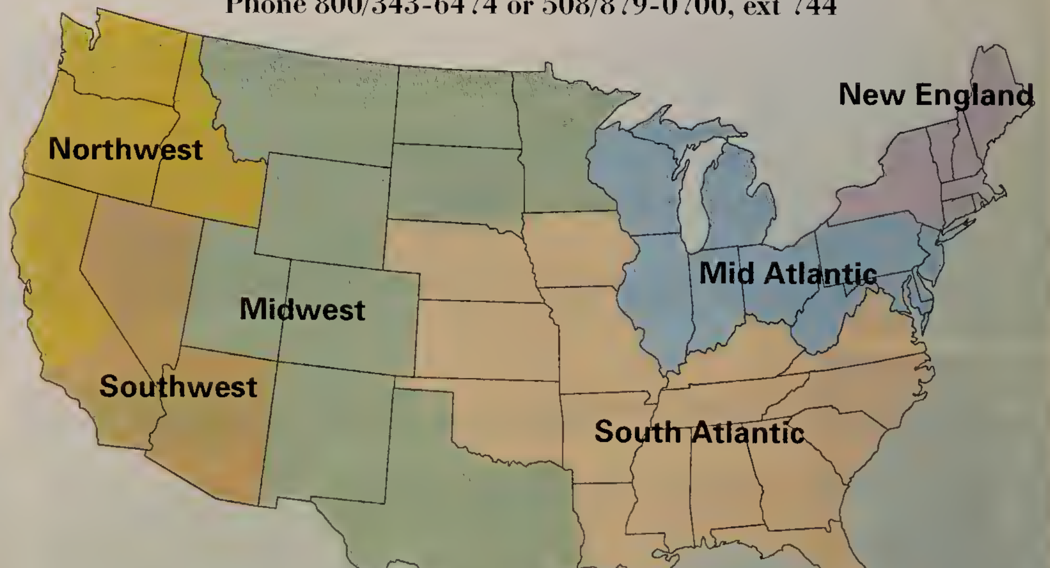

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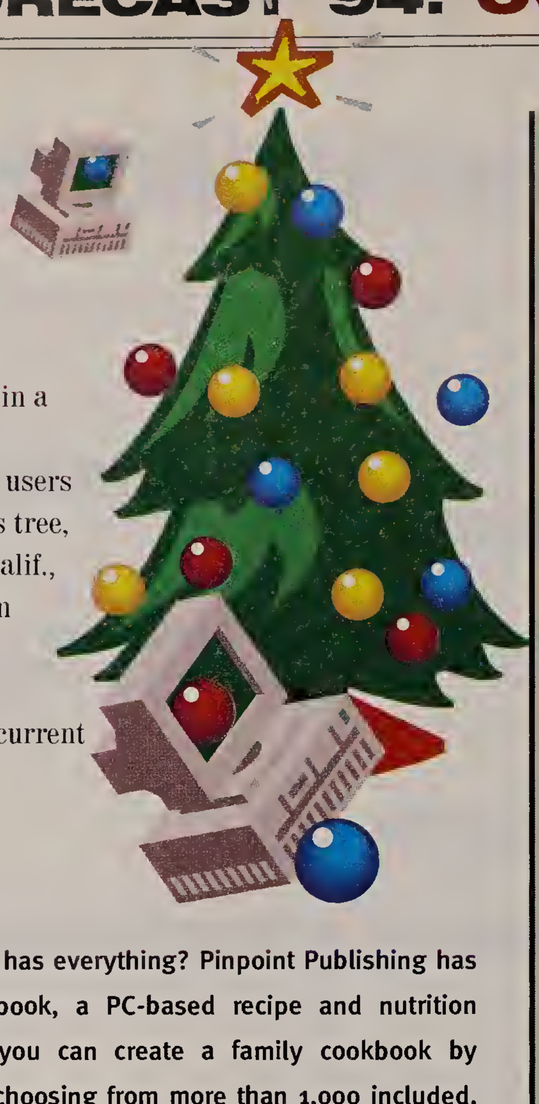

Engineers at software company Cygnus Support, in a moment of sheer techno-inspired yuletide spirit, programmed the company's internal network to enable users to issue commands to the decorations on the company's tree, located in the lobby at the company's Mountain View, Calif., headquarters. Users can bring up a window application called "xmastree" and light the lights and turn other decorations, such as bubble lights and musical bells, on or off. Anyone at any Internet site can check on the current status of the tree's decorations through the command "finger xmastree@cygnus.com."

Illustration & Design by Dave Marshall

Need a gift for the cook who has everything? Pinpoint Publishing has come out with Micro Cookbook, a PC-based recipe and nutrition software package. With it you can create a family cookbook by adding your own recipes or choosing from more than 1,000 included. The software calculates a nutrition summary for all recipes and menus, including ones you add yourself.

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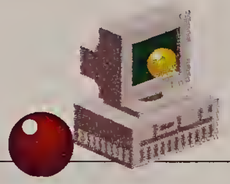


PAUL PREDICTS

A wacky look at the events ahead in 1994 by Editor Paul Gillin.

▶ After two months of meticulous tuning and reprogramming, the Hubble Space Telescope will be turned on to reveal the finest images ever seen of an astronaut's missing screwdriver.

▶ A highly visible, quotable and technically respected CIO will shock the industry by *not* quitting to become a consultant.

▶ Microsoft will announce a six-month delay in Windows 4.0 because of problems implementing Super Tetris in the games group.

▶ The IBM PC Co. will proudly announce that its new products are so successful that it will be unable to fill any more orders for several years.

▶ Seeking a competitive edge in the cutthroat software price wars, Borland will announce that it will pay people to buy Quattro Pro for Windows.

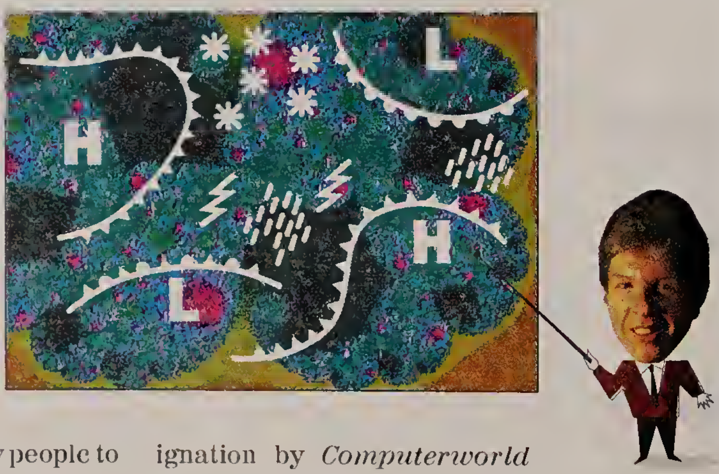
▶ Lotus will announce plans to buy 600,000 copies of Quattro Pro for Windows.

▶ Apple will announce an upgrade to the Newton MessagePad. The device will finally be able to recognize printed characters as long as the writer uses the letters A through E.

▶ Plans to construct an information superhighway will be delayed when it's discovered that the national multimegabit communications network is being funneled through a 1,200 bit/sec. modem in Kansas City.

▶ Lotus will introduce Cliff Notes, a version of its groupware product that allows college students to prepare hypertext documents that make it look like they really read the book.

▶ A group of industry consortia will merge into a single entity known as the COSEPCMCIA-OSFISOANSI. The move will spark a mass resignation by *Computerworld* headline writers.



JANELL GENOVESE

▶ IBM's mainframe division will launch an ad campaign stating that not only are mainframes outstanding transaction processing machines, but they also make handy coatracks.

▶ A major downsizing effort in the travel industry will be scrapped when the system goes live and immediately rebooks 17,000 confirmed reservations into a single hotel room in Parsippany, N.J.

▶ The U.S. will outsource Ross Perot to EDS.

Inside Lines

It's always something

Elements of Microsoft Office 4.0 continue to slide. PowerPoint 4.0, which was scheduled to ship in December, is now slated to ship in January. A Microsoft spokesman attributed the delay to expanded testing. "If they hit the target date within two weeks, they'll be happy," he said.

Users get first whiff of messaging server

Initial test releases or "limited beta" versions of Microsoft's Enterprise Messaging Server (EMS) have shipped to roughly 15 major user sites, a Microsoft spokeswoman confirmed. Sources said the initial reaction is that it looks like EMS is delivering the X.400 messaging server and management functions that Microsoft has promised will be in the product when it ships in mid-1994. The product is still officially unannounced.

Management games

Unix system management platform rivals OpenVision and Tivoli Systems are slugging it out in earnest on at least two fronts. Both are trying to snag third-party applications that were developed for Distributed Manager, the former Unix System Laboratories Unix management venture that Novell recently scrapped [CW, Dec. 20]. Tivoli can perhaps offer easier migration because Distributed Manager was based on its own Management Framework. OpenVision is also trying to get X/Open to reopen a request for technology for a common set of system management APIs. OpenVision wants to submit its own set of APIs to compete against Tivoli, which until now has been the only vendor to respond to X/Open's request for technology.

Redmond, ho!

Digital expects Microsoft's Windows NT to be the company's lead operating system for new business and OpenVMS migration within two years, despite its short-term emphasis on DEC OSF/1. "If a user was planning on making the move [from OpenVMS] two years from now, I'd probably tell him to go to NT," Digital's Chief Technical Officer William Strecker said in a recent interview. "If he was making it next year, I'd probably say OSF/1."

Questions, answers, questions

Symantec Corp. has discontinued development efforts of both the DOS and Windows versions of Q&A, according to the recent buzz on one Prodigy bulletin board. Symantec officials reportedly sent out letters to customers saying both versions of the integrated application were not significant revenue generators and that the company would not produce follow-ups to the existing products.

A chip off the new block

Silicon Graphics plans to soup up its low-end $4,995 Indy workstation with a high-powered, 150-MHz R4400 Mips chip that reportedly boosts performance of computer-aided design and multimedia programs by 50%, company sources said. Three new Indy models will range in price from $5,995 to $22,995, covering much of the Unix workstation industry's power range. The Indy machines are set to ship in March, but users who wait until late 1994 will be able to buy upgrade kits that clip on to the original Indy's backplane.

The marketing minds at Hewlett-Packard have decided that "post-RISC" is not such a clever term for the company's next-generation processor [CW, Dec. 6]. "When you say 'post' anything, you raise concerns about compatibility," an HP spokesman noted. So while the company's research lab will continue to use the nomenclature internally to designate the chip, HP is publicly referring to the future component as the PA-9000 and issuing assurances that the chip will be binary-compatible with earlier PA models. Users are anxious to see further proof. Phone, fax or CompuServe News Editor Alan Alper with news tips at (800) 343-6474, (508) 875-8931 or 76537,2413, respectively. Or try Computerworld*'s 24-hour voice-mail tip line at (508) 820-8555.*

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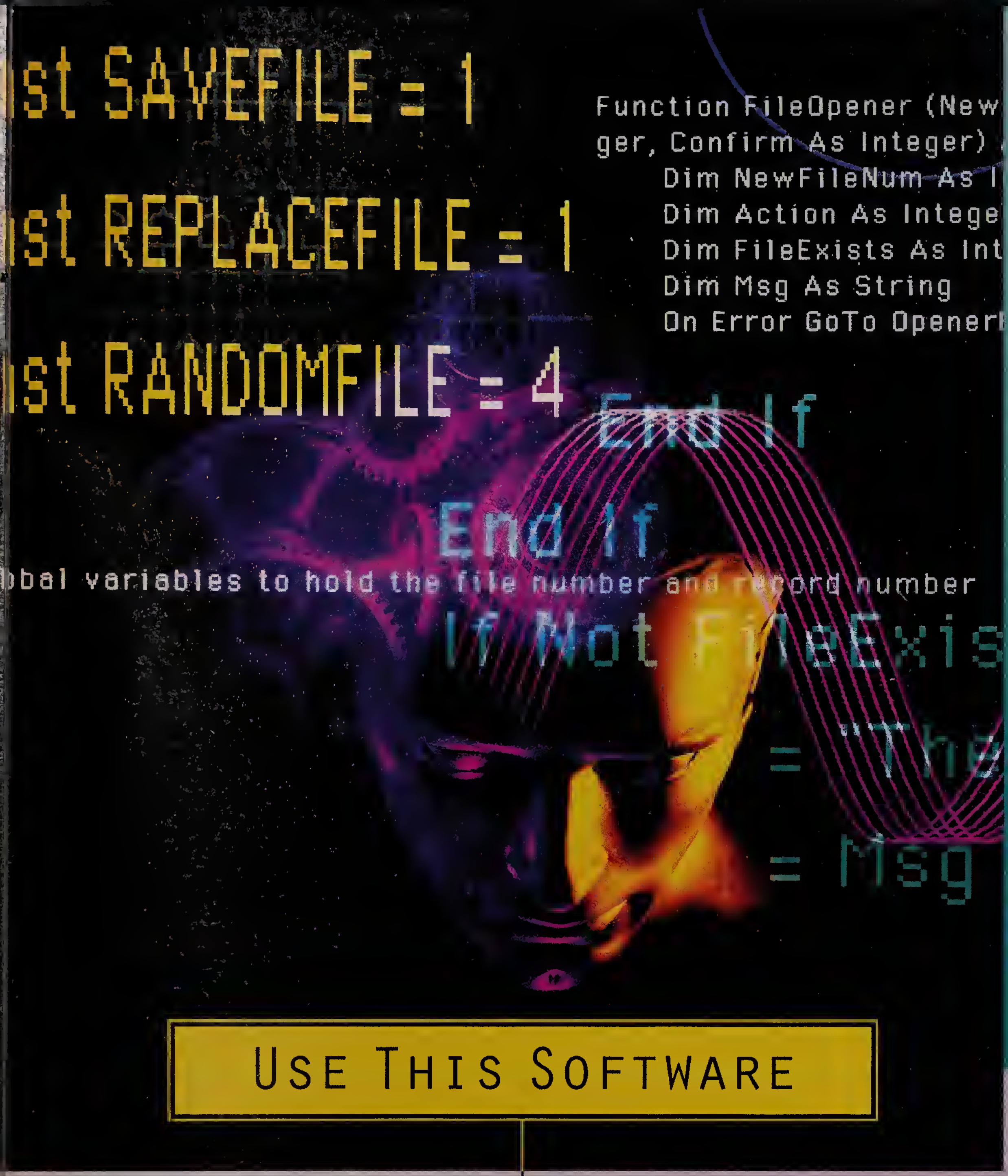

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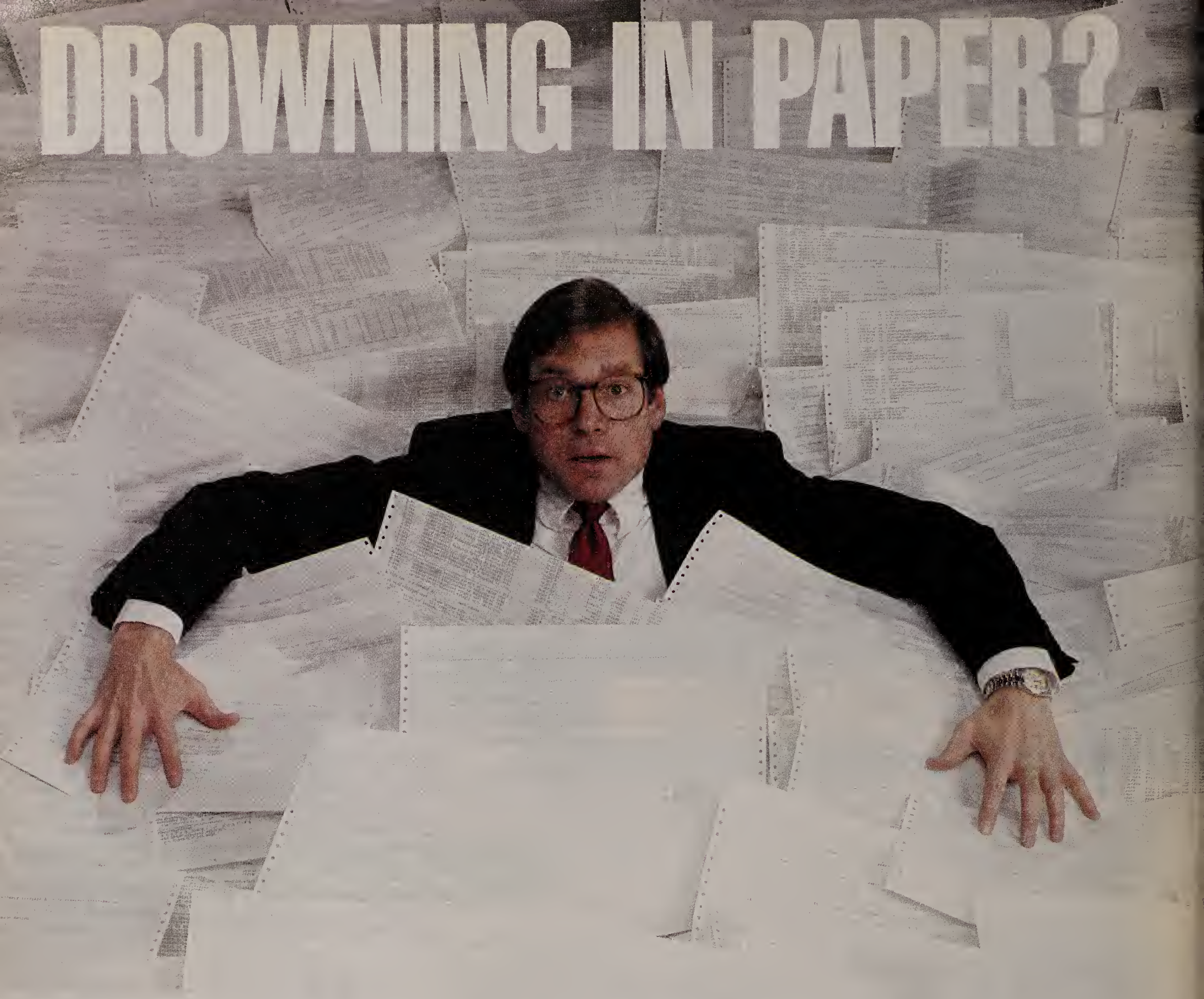

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